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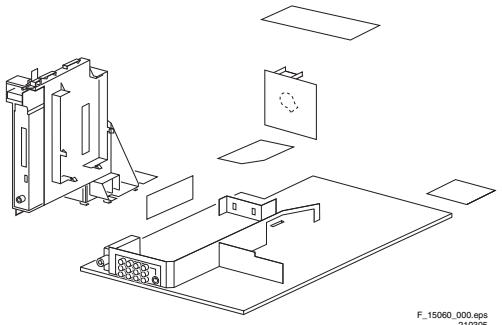

Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

1.1 Technical Specifications
1.2 Connections
1.3 Chassis Overview

Notes:

- Described specifications are valid for the *whole* product range.
- Figures below can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Reception

Display type	:	CRT-DV-SF
Screen size	:	26", 16:9
	:	27", 4:3
	:	30", 16:9
	:	32", 4:3
Tuning system	:	PLL
Color systems	:	NTSC
Sound systems	:	BTSC
Channel selections	:	181, full cable
IF picture carrier	:	45.75 MHz
Aerial input	:	75 ohm, F-type
A/V Connections	:	NTSC M (3.58 - 4.5)

1.1.2 Miscellaneous

Audio output:	:	2 x 10 W
Power supply:		
- Mains voltage range	:	90 - 140 V_ac
- Mains frequency	:	60 Hz
Ambient conditions:		
- Temperature range	:	+5 to +45 °C
- Maximum humidity	:	90% R.H.
Power consumption:		
- Normal operation	:	from 119 W
	:	to 133 W
- Standby	:	< 1 W

1.2 Connections

Note: The following connector color abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

1.2.1 Top Control and Front / Side Connections

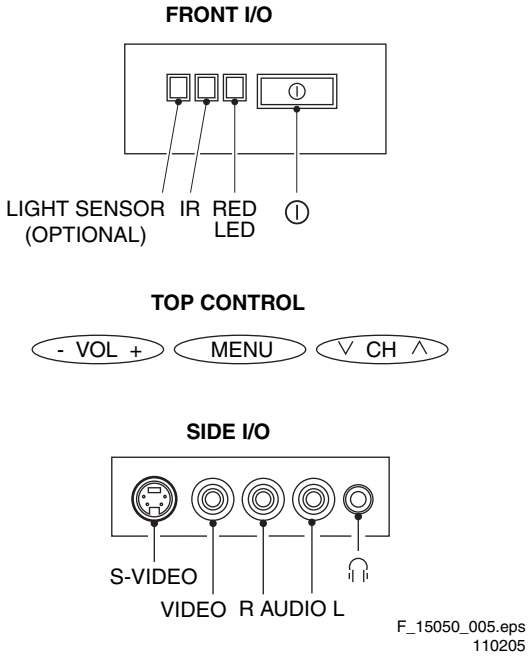


Figure 1-1 Top control and Front / Side connections

Hosiden: SVHS - In

1	- GND	Ground
2	- GND	Ground
3	- Y	1 Vpp / 75 ohm
4	- C	0.3 Vpp / 75 ohm

Audio / Video In

Ye	- Video (CVBS)	1 V_pp / 75 ohm
Wh	- Audio - L	0.2 V_rms / 10 kohm
Rd	- Audio - R	0.2 V_rms / 10 kohm
Bk	- Headphone	8 - 600 Ohm / 4 mW

1.2.2 Rear Connections

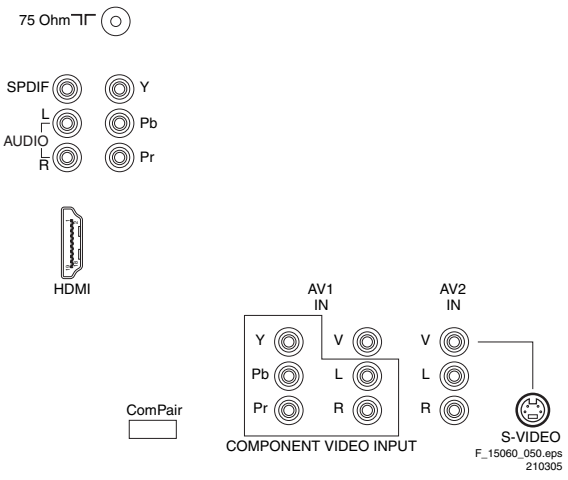


Figure 1-2 Rear connections

Aerial In

- F-type	Coax, 75 ohm	

Monitor Out

Ye - Video (CVBS)	1 V_pp / 75 ohm	
Wh - Audio - L	0.5 V_rms / 1 kohm	
Rd - Audio - R	0.5 V_rms / 1 kohm	

YUV In

Bu - U	0.7 V_pp / 75 ohm	
Rd - V	0.7 V_pp / 75 ohm	
Gn - Y	0.7 V_pp / 75 ohm	

AV1 In

Ye - Video (CVBS)	1 V_pp / 75 ohm	
Wh - Audio - L	0.5 V_rms / 10 kohm	
Rd - Audio - R	0.5 V_rms / 10 kohm	

AV2 In

Ye - Video (CVBS)	1 V_pp / 75 ohm	
Wh - Audio - L	0.5 V_rms / 10 kohm	
Rd - Audio - R	0.5 V_rms / 10 kohm	

AV2 In (SVHS)

1 - Ground	GND	
2 - Ground	GND	
3 - Y	1 V_pp / 75 ohm	
4 - C	0.3 V_pp / 75 ohm	

1.3 Chassis Overview

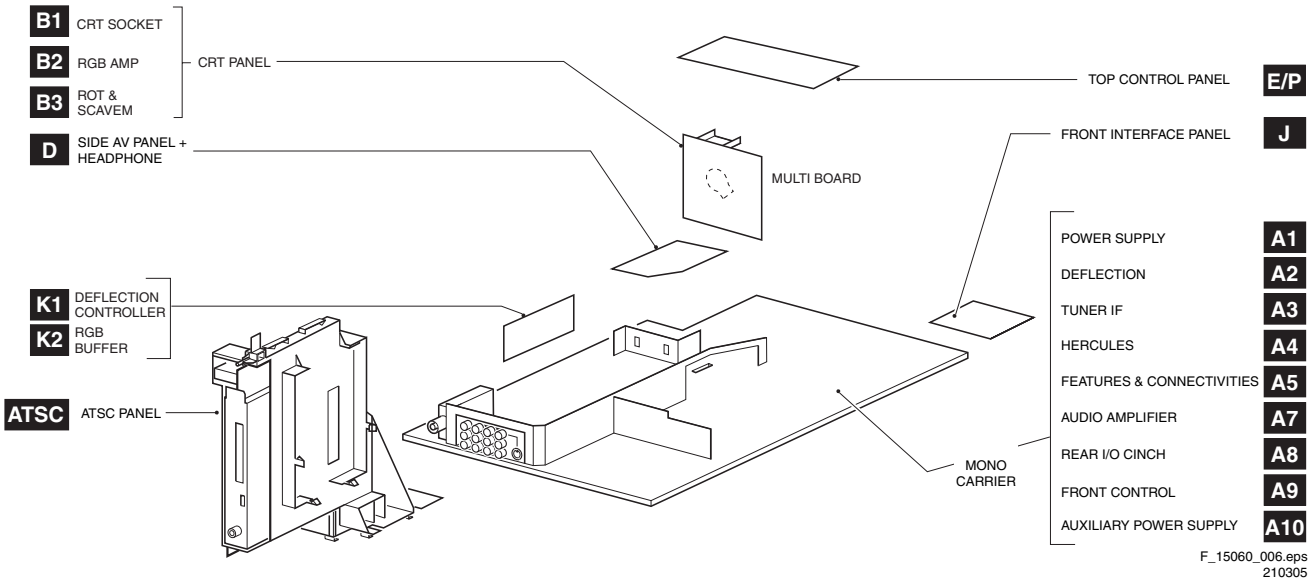


Figure 1-3 PWB location

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions
2.2 Maintenance Instructions
2.3 Warnings
2.4 Notes

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Connect the set to the Mains (AC Power) via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the Mains (AC Power) lead for external damage.
- Check the strain relief of the mains (AC Power) cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the Mains (AC Power) plug and the secondary side (only for sets which have a Mains (AC Power) isolated power supply):
  1. Unplug the Mains (AC Power) cord and connect a wire between the two pins of the Mains (AC Power) plug.
  2. Set the Mains (AC Power) switch to the "on" position (keep the Mains (AC Power) cord unplugged!).
  3. Measure the resistance value between the pins of the Mains (AC Power) plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch "off" the set, and remove the wire between the two pins of the Mains (AC Power) plug.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the “general repair instruction” noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in figure “Discharge picture tube”, to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_{DC}). Discharge until the meter reading is 0 V (after approx. 30 s).

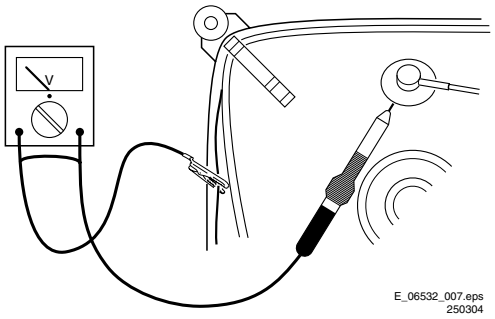


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

- Manufactured under license from Dolby Laboratories. “Dolby”, “Pro Logic” and the “double-D symbol”, are trademarks of Dolby Laboratories.

2.4.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads (μ= x10^{-6}), nano-farads (n= x10^{-9}), or pico-farads (p= x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Rework on BGA (Ball Grid Array) ICs

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device Replacement

The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers.
So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

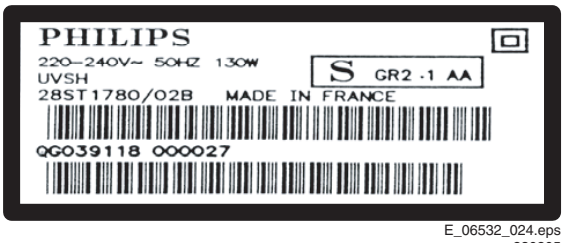
More Information

For more information on how to handle BGA devices, visit this URL: *www.atyourservice.ce.philips.com* (needs subscription, not available for all regions). After login, select “Magazine”, then go to “Workshop Information”. Here you will find Information on how to deal with BGA-ICs.

2.4.4 Lead Free Solder

Philips CE is producing lead-free sets (PBF) from 1.1.2005 onwards.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 5 and 6 refer to the production year, digits 7 and 8 refer to production week (in example below it is 1991 week 18).



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230205

Figure 2-2 Serial number example

Regardless of the special lead-free logo (which is not always indicated), one must treat all sets from this date onwards according to the rules as described below.

Figure 2-3 Lead-free logo

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able
  - To reach at least a solder-tip temperature of 400°C.
  - To stabilise the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If not to avoid, clean carefully the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.
- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened short before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-)pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!).
  Do not re-use BGAs at all!
- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will

be available till the end of the service period. For the repair of such sets nothing changes.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the "Magazine", chapter "Workshop information".

For additional questions please contact your local repair help desk.

2.4.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

4.1 Assy/Panel Removal
4.2 Set Re-assembly

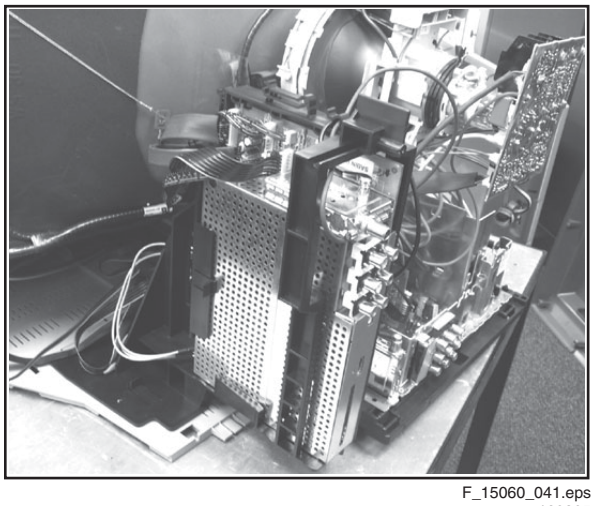
Notes:

- Only the ATSC module and deflection controller panel disassembly are described. For other disassembly instructions, see the Service manual for L05U AA.
- Figures below can deviate slightly from the actual situation, due to different set executions.

4.1 Assy/Panel Removal

4.1.1 ATSC Assy

1. Release the fixation clamp and pull the bracket backwards.



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180305

Figure 4-1 ATSC bracket

4.1.2 ATSC Module Removal

1. Disconnect all cables that lead to the module.
2. Unlock the clip at the left side of the bracket and pull out the ATSC module.

4.1.3 ATSC Panel Removal

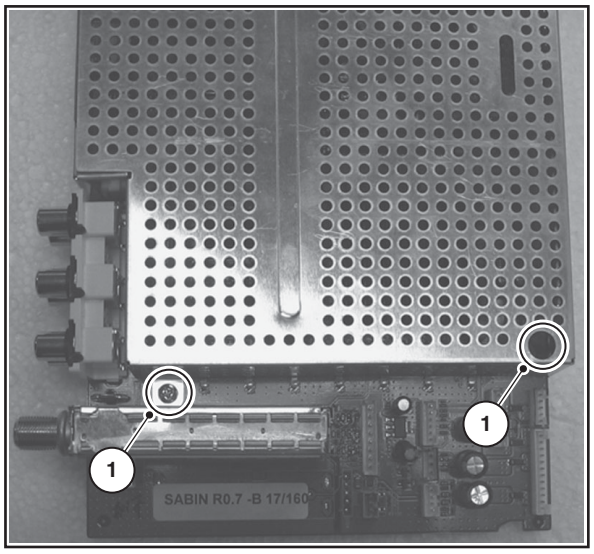

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Figure 4-2 ATSC Module Top Shield Removal

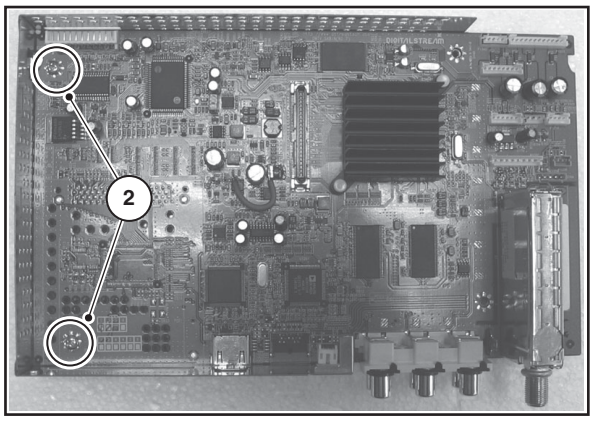

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Figure 4-3 ATSC Panel Removal

1. Unscrew the shield mounting screws [1] and lift the top shield.
2. Unscrew the ATSC panel mounting screws [2] and take out the ATSC panel.

4.1.4 Deflection Control Panel

1. Remove all cables.
2. Pull the panel upwards out of the connectors.

4.2 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.

Note: before you mount the rear cover, perform the following checks:

- Check whether the AC power cord is mounted correctly in its guiding brackets.
- Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points
5.2 Service Modes
5.3 Problems and Solving Tips Related to CSM
5.4 ComPair
5.5 Error Codes
5.6 The Blinking LED Procedure
5.7 Protections
5.8 Fault Finding and Repair Tips

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx. These test points are specifically mentioned in the “Test Point Overview” as “half moons” with a dot in the center.

Table 5-1 Test point overview

Test point	Circuit	Diagr.
F508, F535, F536, F537, F552, F561, F563, F573, F664, I513, I518, I519, I524, I531, I533, I546	Power supply	A1
F401, F412, F413, F414, F418, F452, F453, F455, F456, F458, F459, F460, F461, I408, I416, I417, I420, I462, I468	Line & Frame Deflection	A2
F003, F004, I001, I002	Tuner IF	A3
F201, F203, F205, F206	Hercules	A4
F240, F241, F242	Features & Connectivities	A5
F952, F955, I951, I952	Audio Amplifier	A7
F692	Front Control	A9
F331, F332, F333, F338, F339, F341, F351, F353, F354	CRT Panel	B1
F361, F362, F381, F382	ECO Scavem	B2

Perform measurements under the following conditions:
- Television set in Service Default Alignment Mode.
- Video input: Color bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Modes

Service Default mode (SDM) and Service Alignment Mode (SAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the call center and the customer.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version readout for all chassis.
Minimum requirements for ComPair: a Pentium processor, a Windows OS, and a CD-ROM drive (see also paragraph "ComPair").

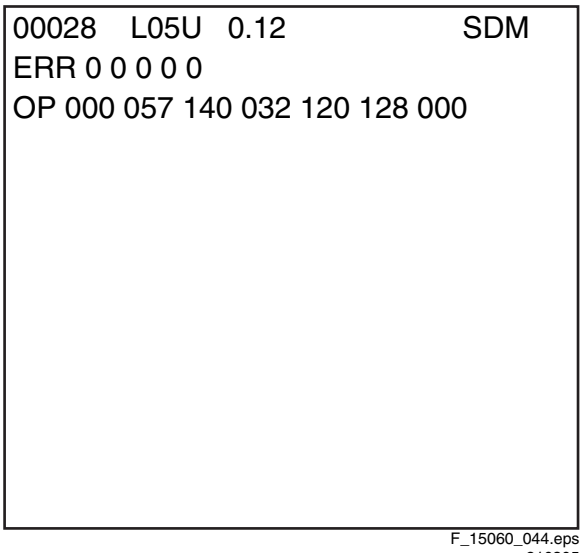
5.2.1 Service Default Mode (SDM)

Purpose
- To create a predefined setting for measurements to be made.
- To override software protections.
- To start the blinking LED procedure.

Specifications
- Tuning frequency: 61.25 MHz (channel 3).
- Color system: NTSC M.
- All picture settings at 50% (brightness, color contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes are:
  – Timer / Sleep timer.
  – Child / parental lock.
  – Blue mute.
  – Hotel / hospital mode.
  – Auto shut off (when no “IDENT” video signal is received for 15 minutes).
  – Skipping of non-favorite presets / channels.
  – Auto-storage of personal presets.
  – Auto user menu time-out.
  – Auto Volume Leveling (AVL).

How to enter
To enter SDM, use one of the following methods:
- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
- Short the jumper wire 9252 with a cold ground on the family board (for example the tuner casing) and apply AC power. Then press the power button (remove the short after start-up).
  Caution: Entering SDM by shorting wire 9252 with ground will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.
- Or via ComPair.

After entering SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode.



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210305

Figure 5-1 SDM menu

How to navigate
Use one of the following methods:
- When you press the MENU button on the remote control, the set will switch on the normal user menu in the SDM mode.
- On the TV, press and hold the VOLUME DOWN and press the CHANNEL DOWN for a few seconds, to switch from SDM to SAM and reverse.

How to exit
Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set off by removing the AC power (i.e., unplugging the television) without using the POWER button, the television set will remain in SDM when AC power is re-applied, and the error buffer is not cleared.

5.2.2 Service Alignment Mode (SAM)

Purpose
- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications
- Operation hours counter (maximum five digits displayed).
- Software version, Error codes, and Option settings display.
- Error buffer clearing.
- Option settings.
- AKB switching.
- Software alignments (Tuner, White Tone, Geometry & Audio).
- NVM Editor.
- ComPair Mode switching.

How to enter
To enter SAM, use one of the following methods:
- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the OSD/ STATUS button (do not allow the display to time out between entries while keying the sequence).
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

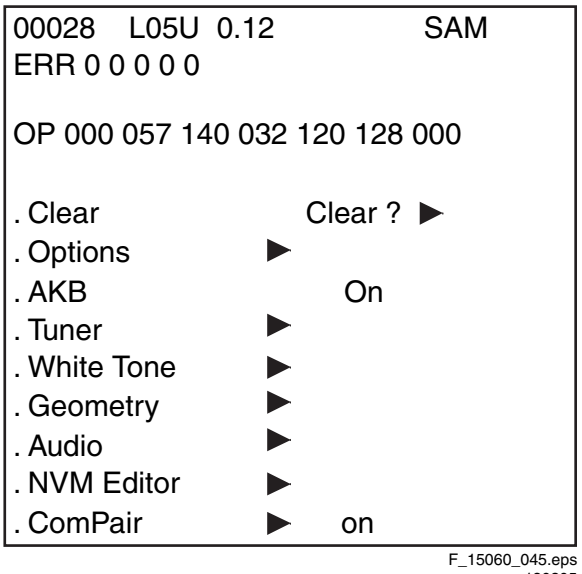
00028 L05U 0.12 SAM
ERR 0 0 0 0 0
OP 000 057 140 032 120 128 000
. Clear Clear ? ▶
. Options ▶
. AKB On
. Tuner ▶
. White Tone ▶
. Geometry ▶
. Audio ▶
. NVM Editor ▶
. ComPair ▶ on

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Figure 5-2 SAM menu

Menu explanation
1. **LLLLL.** This represents the run timer. The run timer counts normal operation hours, but does not count standby hours.
2. **AAABCD-x.y.** This is the software identification of the main microprocessor:
   - **A**= the project name (= L05).
   - **B**= the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - **C**= the software diversity:
     - **Europe:** T= 1 page TXT, F= Full TXT, V= Voice control.
     - **LATAM and NAFTA:** A= ATSC, N= Stereo non-dBx, S= Stereo dBx.
     - **Asian Pacific:** T= TXT, N= non-TXT, C= NTSC.
     - **ALL regions:** M= mono, D= DVD, Q= Mk2.
   - **D**= the language cluster number.
   - **x**= the main software version number (updated with a major change that is incompatible with previous versions).
   - **y**= the sub software version number (updated with a minor change that is compatible with previous versions).
3. **SAM.** Indication of the Service Alignment Mode.
4. **Error Buffer.** Shows all errors detected since the last time the buffer was erased. Five errors possible.
5. **Option Bytes.** Used to set the option bytes. See "Options" in the Alignments section for a detailed description. Seven codes are possible.
6. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
7. **Options.** Used to set the option bits. See "Options" in the Alignments section for a detailed description.
8. **AKB.** Used to disable (Off) or enable (On) the "black current loop" (AKB= Auto Kine Bias).
9. **Tuner.** Used to align the tuner. See "Tuner" in the Alignments section for a detailed description.
10. **White Tone.** Used to align the white tone. See "White Tone" in the Alignments section for a detailed description.
11. **Geometry.** Used to align the geometry settings of the television. See "Geometry" in the Alignments section for a detailed description.
12. **Audio.** No audio alignment is necessary for this television set.
13. **NVM Editor.** Can be used to change the NVM data in the television set. See table "NVM data" further on.
14. **ComPair.** Can be used to switch on the television to In System Programming (ISP) mode, for software uploading via ComPair. **Caution:** When this mode is selected without ComPair connected, the TV will be blocked. Remove the AC power to reset the TV.

How to navigate
- In SAM, select menu items with the MENU UP/DOWN keys on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, use the MENU UP/DOWN keys to display the next / previous menu items.
- With the MENU LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- In SAM, when you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode still active in the background). To return to the SAM menu press the MENU or STATUS/EXIT button.
- When you press the MENU key in while in a submenu, you will return to the previous menu.

How to store SAM settings
To store the settings changed in SAM mode, leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set.

How to exit
Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set “off” by removing the AC power (i.e., unplugging the television) without using the POWER button, the television set will remain in SAM when AC power is re-applied, and the error buffer is not cleared.

5.2.3 Customer Service Mode (CSM)

Purpose
The Customer Service Mode shows error codes and information on the TV’s operation settings. The call center can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call center to diagnose problems and failures in the TV set before making a service call.
The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to enter
To enter CSM, press the following key sequence on the remote control transmitter: **“123654”** (do not allow the display to time out between entries while keying the sequence).

Upon entering the Customer Service Mode, the following screen will appear:

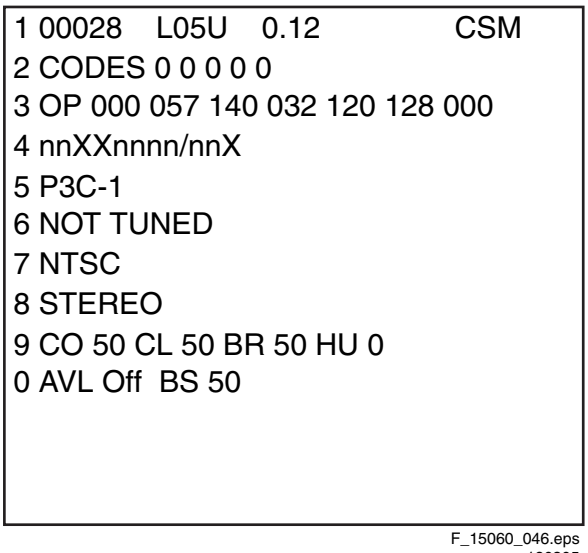
1 00028 L05U 0.12 CSM
2 CODES 0 0 0 0 0
3 OP 000 057 140 032 120 128 000
4 nnXXnnnn/nnX
5 P3C-1
6 NOT TUNED
7 NTSC
8 STEREO
9 CO 50 CL 50 BR 50 HU 0
0 AVL Off BS 50

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Figure 5-3 CSM menu

Menu explanation
1. Indication of the decimal value of the operation hours counter, Software identification of the main microprocessor (see "Service Default or Alignment Mode" for an explanation), and the service mode (CSM= Customer Service Mode).
2. Displays the last five errors detected in the error code buffer.
3. Displays the option bytes.
4. Displays the type number version of the set.
5. Reserved item for P3C call centers.
6. Indicates the television is receiving an "IDENT" signal on the selected source. If no "IDENT" signal is detected, the display will read "NOT TUNED"
7. Displays the detected Color system (e.g. PAL/NTSC).
8. Displays the detected Audio (e.g. stereo/mono).
9. Displays the picture setting information.
10. Displays the sound setting information.

How to exit
To exit CSM, use one of the following methods:
- Press the MENU, STATUS/EXIT, or POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.2.4 Digital Customer Service Mode (DCSM)

Purpose
The Digital Customer Service Mode shows error codes and information on the TV’s digital operation settings. The call center can instruct the customer (by telephone) to enter DCSM in order to identify the digital status of the set. This helps the call center to diagnose problems and failures with the ATSC part before making a service call.
The DCSM is a read-only mode; therefore, modifications are not possible in this mode, with exception of the digital error buffer. This error buffer can be cleared in DCSM.

How to enter
To enter DCSM, the set has to be in digital mode. When the set is in digital mode, press the following key sequence on the remote control transmitter: **“123654”** (do not allow the display to time out between entries while keying the sequence).

Upon entering the Digital Customer Service Mode, the following screen will appear:

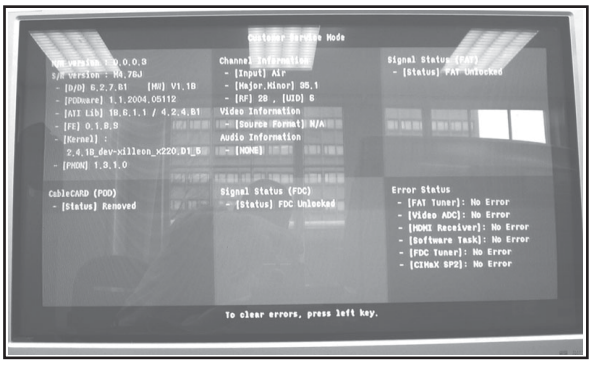

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Figure 5-4 DCSM menu

Menu explanation
1. **H/W version:** Indication of the hardware version of the ATSC module.
2. **S/W version:**
   - **D/D:** The DST driver software version.
   - **HW:** The DST middleware version.
   - **PODware:** The CableCARD software version.
   - **ATI lib:** The ATI software version.
   - **FE:** Front End software version.
   - **Kernel:** Linux kernel software version.
3. **CableCARD (POD):** CableCard present or not.
4. **Channel Information:**
   - **Input:** Displays the input type.
   - **Major.Minor:** Displays the major and minor channel numbers.
   - **RF:** Displays the physical channel number.
   - **UID:** Displays the unique ID.
5. **Video Information:**
   - **Source Format:** Displays the format of the received signal.
6. **Audio Information:**
   - **Dolby:** Displays information on the received audio signal.
7. **Signal Status (FDC):** Not used in this version.
8. **Signal Status (FAT):** Displays the Forward Application status.
   - **Status:** Displays if the signal is locked.
   - **Type:** Displays the type of the received signal.
   - **SQI:** Signal Quality Index (0..100).
   - **Equai_SNR:** Equaliser Signal to Noise Ratio.

- **Tre_SNR:** Trellis Signal to Noise Ratio.
- **RS Error Rate:** Reed-Solomon error rate.

9. **Error Status:** Displays the error status for each device.

How to clear the error buffer
To clear the error buffer, press the LEFT key on the remote control.

How to exit
To exit DCSM, press the RIGHT key on the remote control.

5.3 Problems and Solving Tips Related to CSM

5.3.1 Picture Problems

Note: The problems described below are all related to the TV settings. The procedures used to change the value (or status) of the different settings are described.

Picture too dark or too bright

If:
- The picture improves when you have press the AUTO PICTURE button on the remote control transmitter, or
- The picture improves when you enter the Customer Service Mode,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys (if necessary) to select BRIGHTNESS.
6. Press the MENU LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
7. Use the MENU UP/DOWN keys to select PICTURE.
8. Press the MENU LEFT/RIGHT keys to increase or decrease the PICTURE value.
9. Press the MENU button on the remote control transmitter twice to exit the user menu.
10. The new PERSONAL preference values are automatically stored.

White line around picture elements and text

If:
The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select SHARPNESS.
6. Press the MENU LEFT key to decrease the SHARPNESS value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Snowy picture
Check CSM line 6. If this line reads “Not Tuned”, check the following:
- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 2, the Error Buffer line, will contain error number 10). Check the tuner and replace/ repair the tuner if necessary.

Black and white picture

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select COLOR.
6. Press the MENU RIGHT key to increase the COLOR value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Menu text not sharp enough

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select PICTURE.
6. Press the MENU LEFT key to decrease the PICTURE value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.

- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force/SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial (or RS232) cable.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- Automatic (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C/UART level. ComPair can access the I2C/UART bus of the television. ComPair can send and receive I2C/UART commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C/UART buses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES / NO*) and showing you examples (e.g. *Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the fault finding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:
- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the (European) Dealer Service Tool (DST).
- If both ComPair and Force/SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.
  Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier*.
  – Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  – Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How To Connect

This is described in the chassis fault finding database in ComPair.

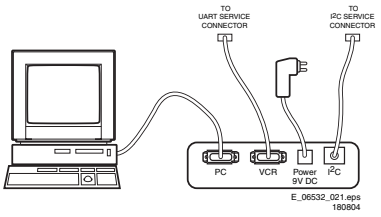


Figure 5-5 ComPair interface connection

5.4.4 How To Order

ComPair order codes (US):
- ComPair Software: ST4191.
- ComPair Interface Box: 4822 727 21631.
- AC Adapter: T405-ND.
- ComPair Quick Start Guide: ST4190.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630

Note: If you encounter any problems, contact your local support desk.

5.5 Error Codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

5.5.1 How To Read The Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SAM (if you have a picture). **Examples:**
  – ERROR: 0 0 0 0 0 : No errors detected
  – ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  – ERROR: 9 6 0 0 0 : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See “The Blinking LED Procedure”.
- Via ComPair.

5.5.2 How To Clear The Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: "**062596**" directly followed by the OSD/STATUS button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is highlighted. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. The text on the right side of the "CLEAR" line will change from "CLEAR?" to "CLEARED"
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the AC power from the television set, the error buffer is not reset.

5.5.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error

Table 5-2 Error code overview

Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray/Over-voltage protection (US only)	2411, 2412, 2413, 6404, 6411, 6412	A2
2	Not applicable	High beam (BCI) protection	3412, 7405	A2
3	Not applicable	Vertical guard protection	3466, 7451	A2
4	Not applicable	-	-	-
5	Not applicable	+5v protection	7604, 7605	A5
6	I2C bus	General I2C error	7200, 3207, 3214	A4
7	Not applicable	-	-	-
8	Not applicable	-	-	-
9	24C16	I2C error while communicating with the EEPROM	7601, 3604, 3605	A5
10	Tuner	I2C error while communicating with the PLL tuner	1000, 5001	A3
11	TDA6107/A	Black current loop instability protection	7330, 3351, CRT	B1
19	TDA1200x	I2C error while communicating with sound decoder in Hercules IC	7200	A4
20	TDA1200x	I2C error while communicating with video cosmic in Hercules IC	7200	A4
33	TA1360AFG	I2C error while communicating with the ATSC PQ	-	ATSC module
34	TA1317AFG	I2C error while communicating with the ATSC deflection controller	-	ATSC module
35	SAA5565	I2C error while communicating with the ATSC uProcessor	-	ATSC module

5.6 The Blinking LED Procedure

Using this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the front LED will blink the contents of the error-buffer:
- When all the error-codes are displayed, the sequence finishes with a LED blink of 1.5 seconds,
- The sequence starts again.

Example of error buffer: **12 9 6 0 0**
After entering SDM, the following occurs:
- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again at 12 short blinks.

5.7 Protections

If a fault situation is detected, an error code will be generated; and, if necessary, the television set will go into protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in protection mode. The error codes of the error buffer and the blinking LED procedure can be read via the Service Default Menu (SDM), or via ComPair.

To get a quick diagnosis the chassis has three service modes implemented:
- The Customer Service Mode (CSM).
- The Service Default Mode (SDM).
- The Service Alignment Mode (SAM).
- The Digital Customer Service Mode (DCSM).

For a detailed mode description, see the relevant sections.

5.8 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.8.1 NVM Editor

In some cases, it can be handy if one directly can change the NVM contents. This can be done with the "NVM Editor" in SAM mode. In the next table, the default NVM values are given.

Table 5-3 NVM default values for NAFTA-region

Item	Address (dec)	Default values (hex)			
		26PW21718	30PW21709	27PT21714	32PT21705
NVM Table Version	19	15	15	15	15
Option Table Version	20	70	70	70	70
EW (EW Width)	56	3C	66	3D	3C
PW (EW Parabola Width)	57	0E	14	17	28
HS (Horizontal Shift)	58	58	56	5A	5E
HP (Horizontal Parallelogram)	59	08	08	08	07
HB (Horizontal Bow)	60	08	0A	09	05
UCP (EW Upper Corner Parabola)	61	10	16	10	10
LCP (EW Lower Corner Parabola)	62	0F	07	11	11
TC (EW Trapezium)	63	40	54	44	43
VS (Vertical Slope)	64	00	00	00	00
VA (Vertical Amplitude)	65	40	2F	33	3D
VSC (S-Correction)	66	2C	23	32	35
VSH (Vertical Shift)	67	40	41	3F	42
VX (Vertical Zoom)	68	00	00	00	0F
VSL (Vertical Scroll)	69	79	74	78	72
VL (Vertical Linearity)	70	10	12	11	12
EWS (EW S Correction)	71	10	00	10	10
EWC (EW Corner)	72	10	0C	12	16
AGC (AGC Takeover)	163	1D	1D	1D	1D
OIF (IF-PLL Offset)	164	26	26	26	26
IFAGC, SBO	166	20	20	20	20
Hercules Default SOC & Brightness	211	1F	1F	1F	1F
Hercules Default Color	212	10	10	10	10
Hercules Default Contrast	213	1F	1F	1F	1F
Hercules Default Sharpness	214	0D	0D	0D	0D
Hercules Default Hue	215	20	20	20	20
Hercules Default Base-Band Tint	216	20	20	20	20
Hercules Default White Point Red	217	20	20	20	20
Hercules Default White Point Green	218	20	20	20	20
Hercules Default White Point Blue	219	20	20	20	20
Hercules Default CL & PWL	220	DF	DF	DF	DF
Hercules Default RF & AV Y Delay	221	77	77	77	77
Hercules Default BLOR	222	20	20	20	20
Hercules Default BLOG	223	20	20	20	20
Last Brightness (VID PP others)	264	1E	1E	1E	1E
Last Color (VID PP others)	265	44	44	44	44
Last Contrast (VID PP others)	266	64	64	64	64
Last Sharpness (VID PP others)	267	44	44	44	44
Last Hue (VID PP others)	268	32	32	32	32
Last Color Temperature (VID PP others)	269	01	01	01	01
White-D Cool Red	356	FA	FA	FA	FA
White-D Cool Blue	357	12	12	12	12
White-D Normal Red	358	52	52	52	52
White-D Normal Blue	359	4C	4C	4C	4C
White-D Warm Red	360	0A	0A	0A	0A
White-D Warm Blue	361	E8	E8	E8	E8

5.8.2 Power Supply

Set Not Working

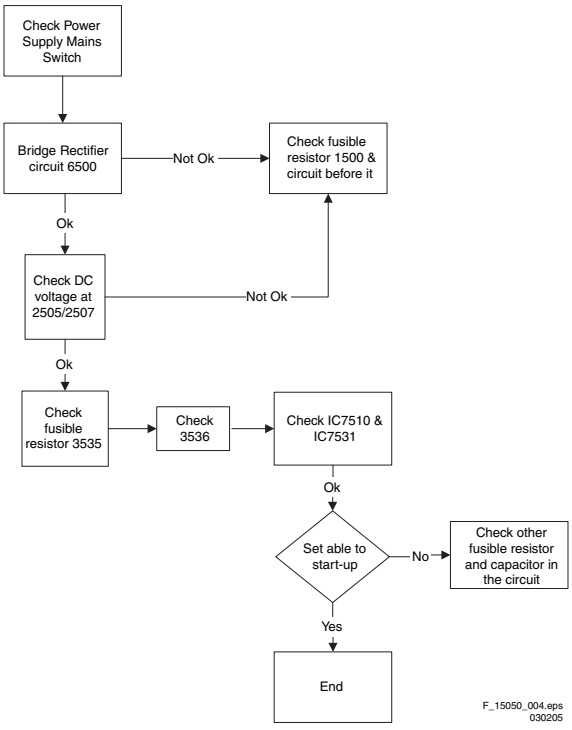


Figure 5-6 Fault finding tree "Set not working"

Set Does Not Start Up

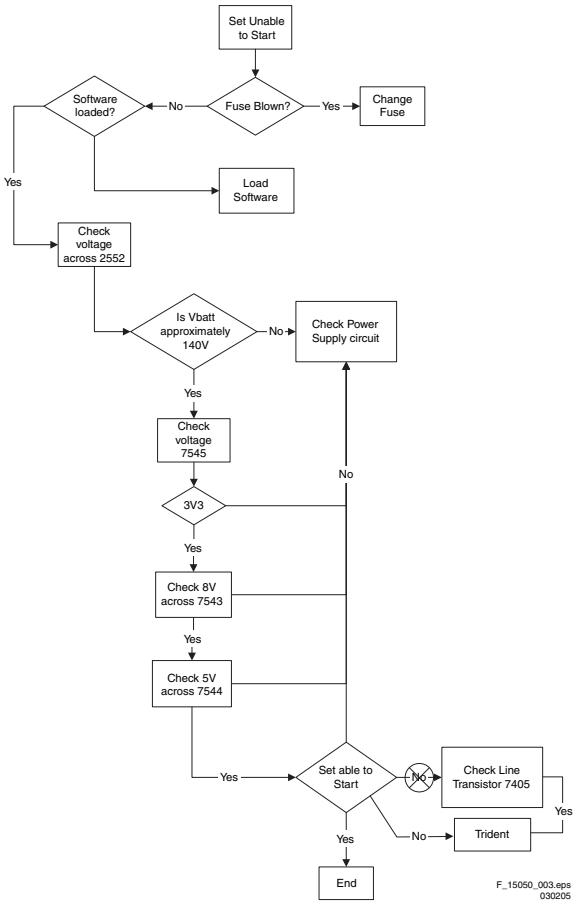


Figure 5-7 Fault finding tree "Set does not start up"

5.8.3 Deflection

One Thin Vertical Line

Quick check:

- Set in protection mode.
- LED blinking with error “3”.

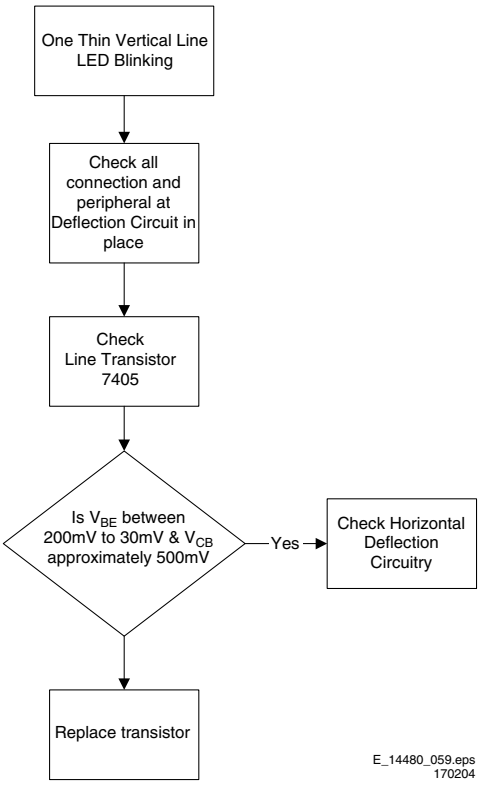

One Thin Vertical Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check Line Transistor 7405
Is V_{BE} between 200mV to 30mV & V_{CB} approximately 500mV
Yes
Check Horizontal Deflection Circuitry
Replace transistor
E_14480_059.eps 170204

Figure 5-8 Fault finding tree “One thin vertical line”

One Thin Horizontal Line

Quick check:

- Set in protection mode.
- LED blinking with error “2”.

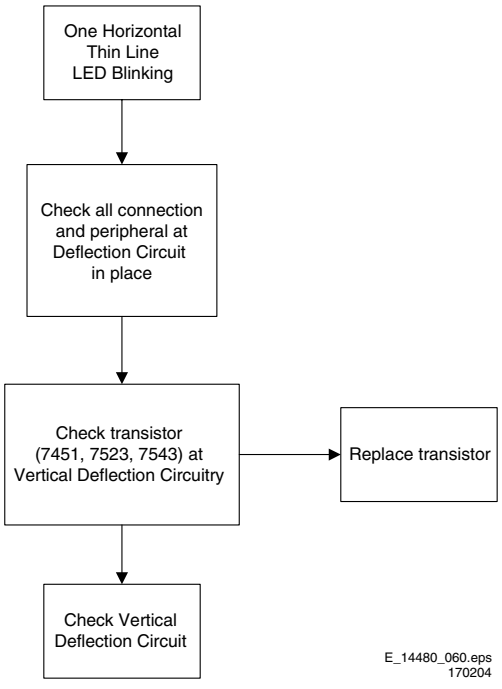

One Horizontal Thin Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check transistor (7451, 7523, 7543) at Vertical Deflection Circuitry
Replace transistor
Check Vertical Deflection Circuit
E_14480_060.eps 170204

Figure 5-9 Fault finding tree “One thin horizontal line”

Blank Screen

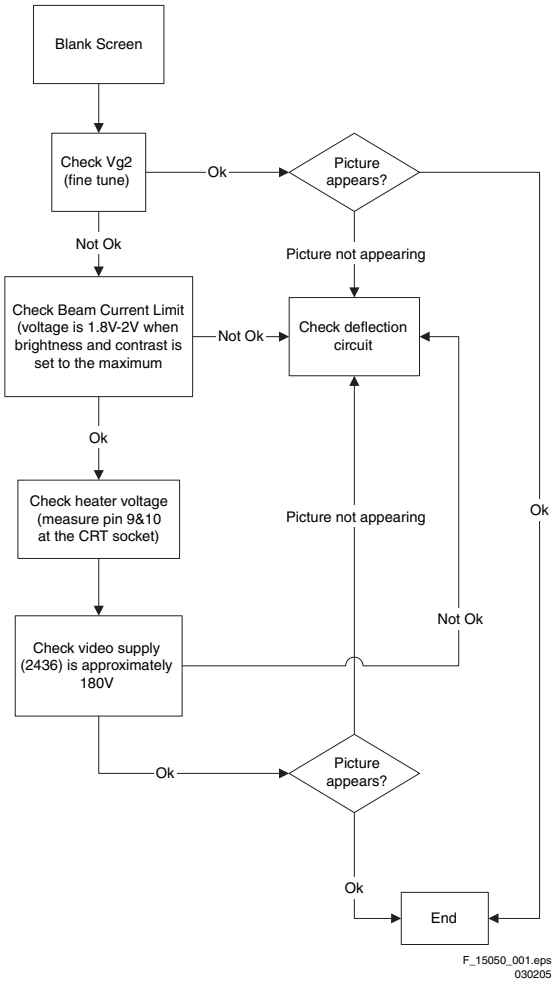


Figure 5-10 Fault finding tree “Blank screen”

5.8.4 Source Selection

Set is not able to go into AV or any missing AV is encountered

E.g. AV1 is available but not able to enter to AV1: Check if the option setting is correct.

Set is able to go to AV, but no audio is heard.

1. Check that continuity of signal is there from the SCART/ Cinch input to the input of the Hercules.
2. If continuity is there and still no audio, check that option settings are correct.
3. If logic setting is correct and still no audio, proceed to Audio Decoder/Processor troubleshooting section.

Set is able to go into AV but no video is available:

1. Check continuity from AV input to HERCULES depending on the input.
2. If continuity is available and yet no video, proceed to Video Processor troubleshooting section.

5.8.5 Tuner and IF

No Picture

1. Check that the Option settings are correct.
2. If correct, check that supply voltages are there.
3. If supply voltages are present, check whether picture is present in AV.
4. If picture is present in AV, check with the scope the Tuner IF output signal by manual storage to a known channel.
5. If IF output is present, Tuner is working fine. If no IF output, I2C data lines may be open, check continuity of I2C lines. If I2C lines are ok, Tuner may be defect, replaced Tuner.
6. If Tuner IF is present and yet still no picture in RF mode, go to Video Processing troubleshooting section.

No Picture, No Sound

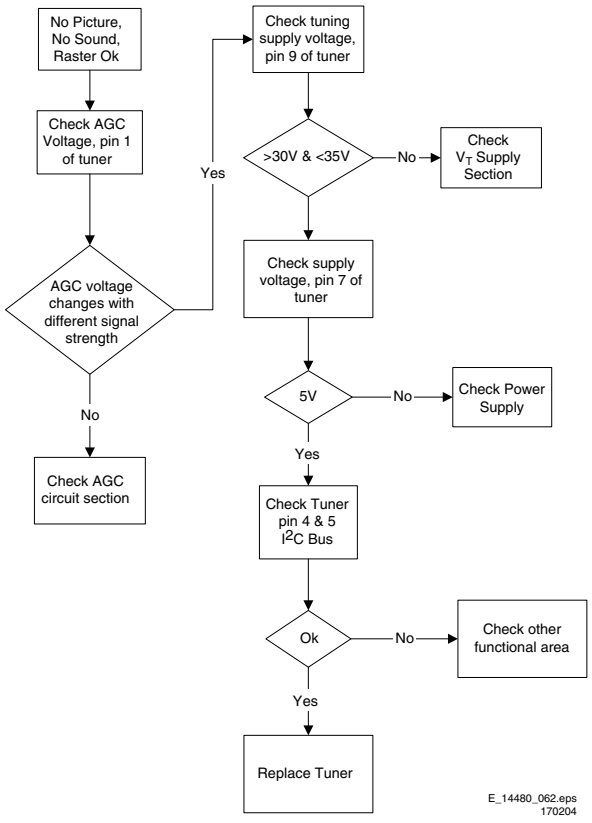


Figure 5-11 Fault finding tree "No picture, no sound"

Picture Ok, No Sound

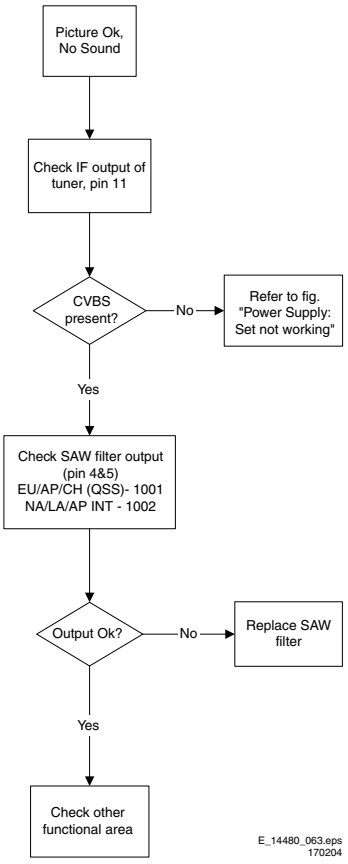


Figure 5-12 Fault finding tree "Picture ok, no sound"

Unable To Perform Tuning

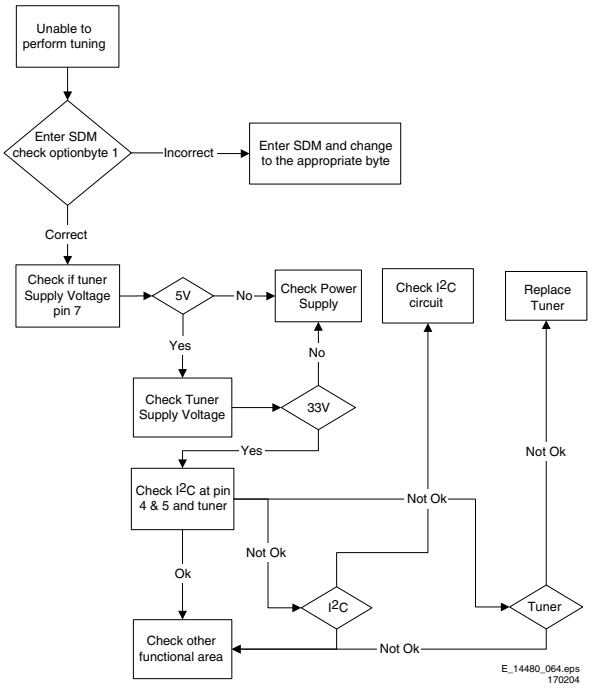


Figure 5-13 Fault finding tree "Unable to perform tuning"

5.8.6 Controller

Below are some guidelines for troubleshooting of the Micro Controller function. Normally Micro Controller should be checked when there is a problem of startup.

1. Check that both +3.3 V_dc and +1.8 V_dc are present.
2. Check that crystal oscillator is working.
3. Check that Power Good signal is at “high” logic, normal operation.
4. Check that HERCULES is not in standby mode. Pin 15 of HERCULES should be 0 V_dc.
5. Make sure H-drive pulse is there. This can be checked at resistor R3239. If H-drive does not exist, remove resistor R3239 to check if there is loading.

Note: When the set shuts down after a few second after power “on”, the main cause is that Vg2 not aligned properly, try adjusting Vg2 during the few seconds of power “on”.

5.8.7 Video Processing

No Picture

When “no picture in RF”, first check if the microprocessor is functioning ok in section “Controller”. If that is ok, follow the next steps.

When “no picture in AV”, first check if the video source selection is functioning ok in section “Source Selection”. If that is ok, follow the next steps.

1. Check that normal operating conditions are met.
2. Check that there is video signal at pin 81. If no video, demodulator part of the HERCULES is faulty, replace with new HERCULES.
3. If video signal is available at pin 81, check pin 56, 57, and 58 for the RGB signal.
4. If signal is not available, try checking the BRIGHTNESS and/or CONTRAST control, and make sure it is not at zero.
5. If still with the correct settings and no video is available, proceed to the CRT/RGB amplifier diagram.

For sets with TDA9178, follow steps below:

1. Put Option Byte 2 bit 4 to “0”; if video signal is not available, then check fault finding section “Controller”, Section “Source Selection”, and steps above.
2. If video is available but not correct, put Option Byte 2 bit 4 to “1”, then check if LTI panel is present. If not, put LTI panel in the main chassis (connector 1221).
3. If LTI panel is in main chassis, check cable between LTI panel and main chassis (position is 1206). If it is connected, then the LTI panel is faulty, replace it.

For sets with Scavem, and Scavem does not work, follow steps below:

1. Check Scavem coil connector (position is 1361) if connected; if not, connect it.
2. If connected, check NVM “bit storage” byte 1 bit 7; if it is not “1”, set it to “1”.
3. If it is “1”, then check the data of the NVM addresses as in the next table. If the data is not correct, then set these addresses to diagram values.
4. If it still not works, track Scavem output from pin64 of HERCULES to CRT panel.

Table 5-4 NVM default values for Scavem

Description	Address (dec)	Address (hex)	Value (hex)
SPR, WS	140	8C	00
VMA, SVM	141	8D	32
NVM_SOC_SMD	142	8E	03

5.8.8 Audio Processing

No Sound

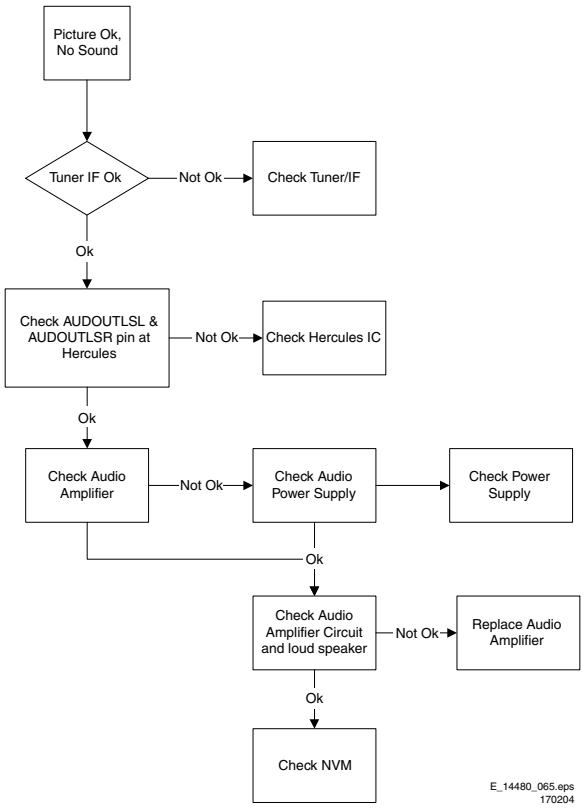


Figure 5-14 Fault finding tree “No sound”

No RF audio for QSS/Inter-Carrier stereo sets.

1. Check pin 99 and 100 for SIF signal (for QSS) or pin 104 and 105 for video with SIF (for Inter-Carrier)
2. If signal is not present, check for the QSS/FMI bit settings. Check also the NVM data.
3. If signals are present and still no audio, check the audio supply voltage +8V are present.
4. If still no audio signal at Hercules output, Hercules is faulty.

No AV audio.

1. Check troubleshooting methods in section “Source Selection”.
2. Check the output of the Hercules to see if there is signal available. If no, check the normal operating condition and also the NVM data.
3. If still no audio signal at Hercules output, Hercules is faulty.

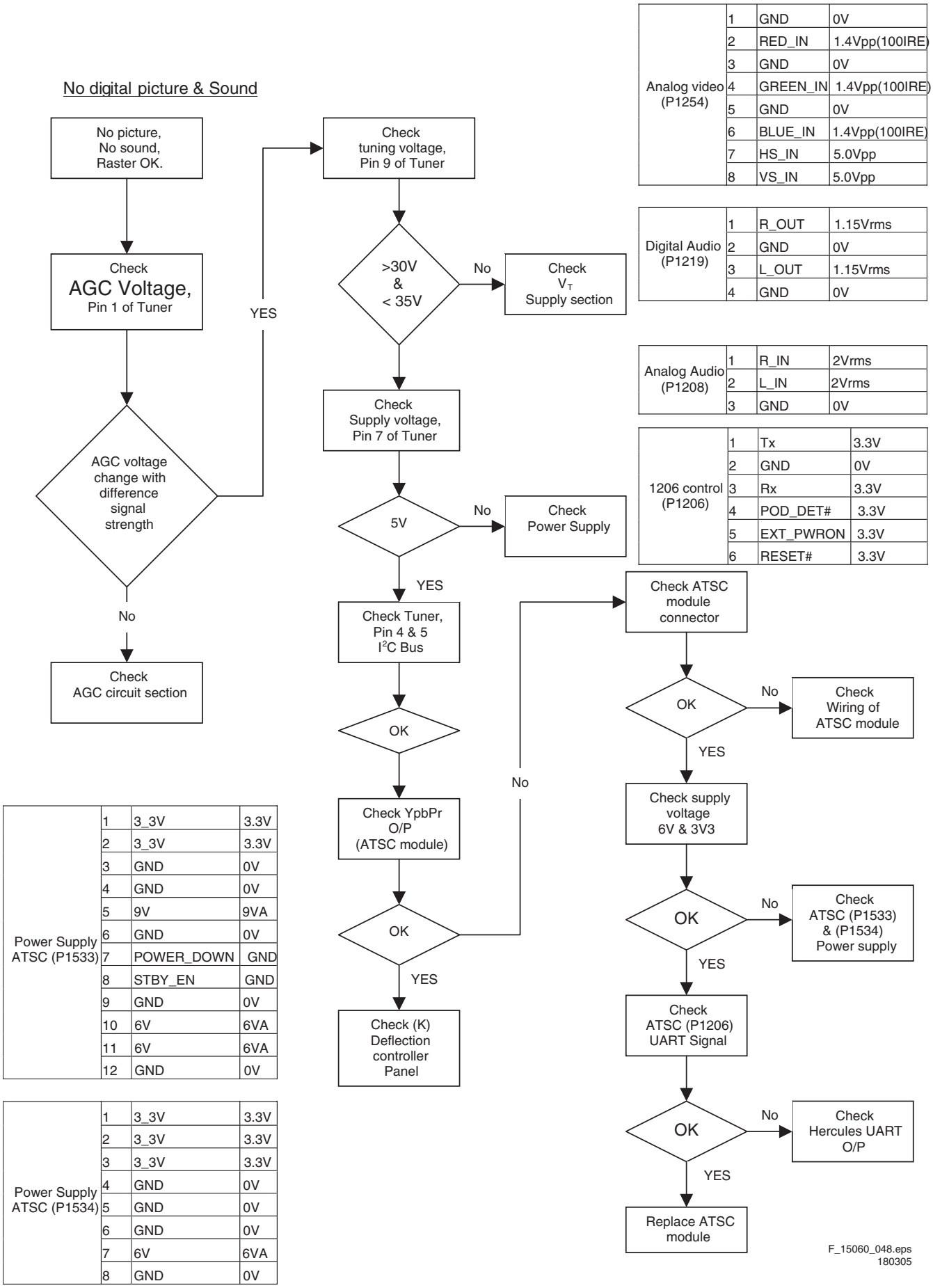
Note: If there is audio signal at Hercules output and no audio at loudspeaker, proceed to Audio Amplifier troubleshooting methods.

5.8.9 Audio Amplifier

No RF as well as AV audio at the loudspeaker:

1. Check that the normal operation condition of the amplifier is met.
2. If normal operation conditions are met, check the continuity from Hercules output to input of the amplifier.
3. If continuity is there and still no audio, check speaker wire connections. If still no audio, amplifier IC might be faulty.

5.8.10 ATSC



Analog video (P1254)	1	GND	0V
	2	RED_IN	1.4Vpp(100IRE)
	3	GND	0V
	4	GREEN_IN	1.4Vpp(100IRE)
	5	GND	0V
	6	BLUE_IN	1.4Vpp(100IRE)
	7	HS_IN	5.0Vpp
	8	VS_IN	5.0Vpp

Digital Audio (P1219)	1	R_OUT	1.15Vrms
	2	GND	0V
	3	L_OUT	1.15Vrms
	4	GND	0V

Analog Audio (P1208)	1	R_IN	2Vrms
	2	L_IN	2Vrms
	3	GND	0V

1206 control (P1206)	1	Tx	3.3V
	2	GND	0V
	3	Rx	3.3V
	4	POD_DET#	3.3V
	5	EXT_PWRON	3.3V
	6	RESET#	3.3V

Power Supply ATSC (P1533)	1	3_3V	3.3V
	2	3_3V	3.3V
	3	GND	0V
	4	GND	0V
	5	9V	9VA
	6	GND	0V
	7	POWER_DOWN	GND
	8	STBY_EN	GND
	9	GND	0V
	10	6V	6VA
	11	6V	6VA
	12	GND	0V

Power Supply ATSC (P1534)	1	3_3V	3.3V
	2	3_3V	3.3V
	3	3_3V	3.3V
	4	GND	0V
	5	GND	0V
	6	GND	0V
	7	6V	6VA
	8	GND	0V

Figure 5-15 Fault finding tree "ATSC part"

5.8.11 Deflection Controller

Check Deflection Controller Panel (ATSC set only)

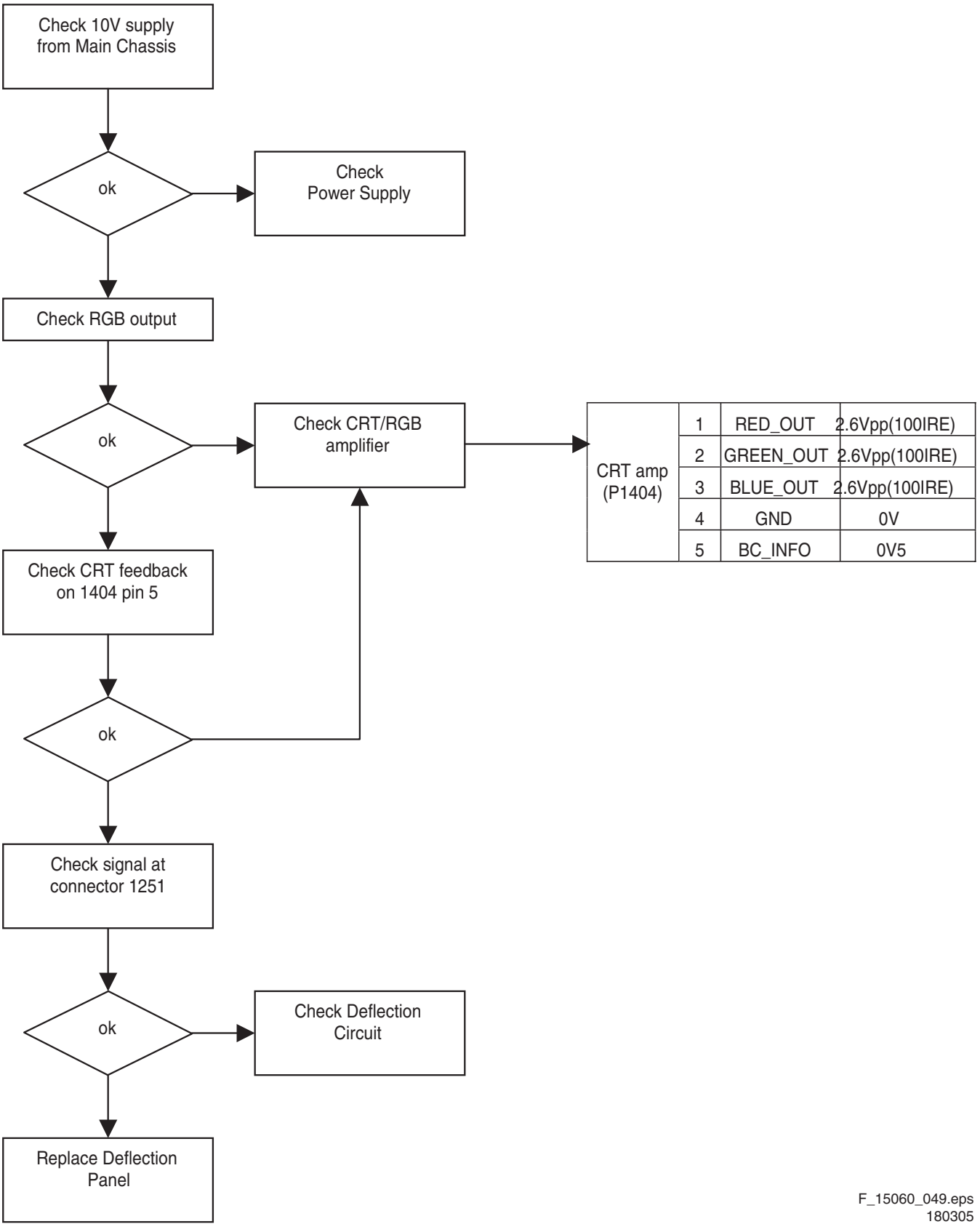


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Figure 5-16 Fault finding tree "Deflection Controller"

Personal Notes:

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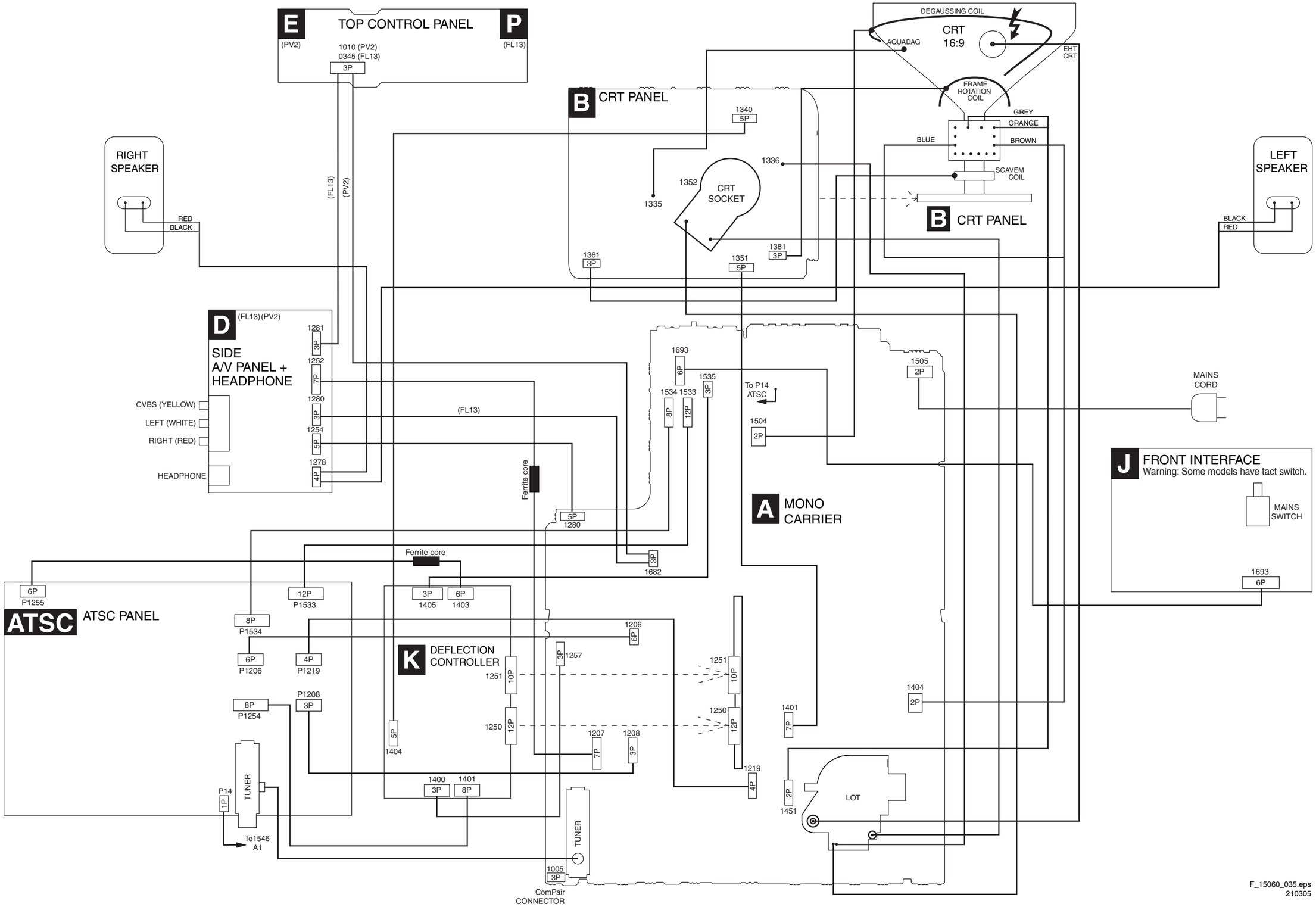
6. Block Diagrams, Testpoint Overviews, and Waveforms

Wiring Diagram



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Block Diagram Supply and Deflection

SUPPLY AND DEFLECTION

SUPPLY

J FRONT INTERFACE

1211, 1231, 1212
MAINS SWITCH (not USA)

A1 POWER SUPPLY

1504 Degaussing Coil
1503 7541 ENERGIZING CIRCUIT (optional) V_DG
3523 +θ
1505 or
1500 T4E
5500 ÷ 5502
6500 AC DC
F508
VDC
2505
MAIN – SUPPLY –
5512
7404
F552 5552 Vbatt
F563 -Vaudio
F561 +Vaudio
+6V
I513 3513
I516
7511 TEA1506T
DRAIN DRIVER SENSE CTRL DEMAG Vcc
CONTROL IC
3514
I519
3522
7512 D G S
7514
3516
I511
2511
3517
6511
3518
3519
VCC
7513 TCET1103
3571
7571 REFERENCE CIRCUIT
3575
3576
+3V3
7573 STANDBY CIRCUIT
Stdby_Con A4
I573
6573
5561 6562
5562 6563
HOT GROUND
COLD GROUND

A10 AUXILIARY POWER SUPPLY

VCC
VDC
1532
5504
7510 SUPPLY CONTROL
3536
7525
B
7509
+6VA
+6V
6545
6552
6544
6546
5527
5526
7545
+3V3A
+3V
+3V3
7561
POWER_DOWN A4
1535
7535
6539
5524
+12VA
3560
+8VA
3542
7542 REFERENCE CIRCUIT
3545
3544
7543
+8V
7516 TCET1103
7575 STANDBY CIRCUIT
Stdby_con A4
HOT GROUND
COLD GROUND

K2 RGB BUFFER - ATSC

1403
TO P1255 ATSC PANEL
F_Y
F_Pb
F_Pr

K1 DEFLECTION CONTROLLERS

7404 TA1317AFG
DEFLECTION PROCESSOR
V_NF
EHT
VDRIVE
VDC
EW_FD
EWFILTER
3410
3470
3429
6408
7403
7405
Vguard
EHTinfo
VDRA
VDRB
EW_DRIVE
VM_MOD
HFB
H_DRV
1251
7402 TA1360AFG
SIGNAL AND SYNC PROC.
F_Y
F_Pb
F_Pr
VSM_OUT
FBP_IN
H_OUT
7406/7416
3434

G LINEARITY & PANORAMA

ONLY FOR:
28"WSRF LA/NA
32" WSRF LA/NA
28" WS-SF LA
7460 ACTIVATING CIRCUIT
7462
2464
2467
2466
1404
LINEARITY AND PANORAMA CORRECTION
1461
HOR. DEFL. COIL
2474
2475
1462
+9V
1463
7463
TO 1221 A5 CONNECTIONS
I2SD/1

A2 LINE + FRAME DEFLECTION

Vbatt
LINE
+6V 6481
7404
5402
7405 BU4508DX
5450
EHT
TO CRT B1
OR
LINE OUTPUT CIRCUIT + E/W CORR.
1404
HOR. DEFL. COIL
EW_DRIVE
FOCUS G2
EHTinfo
2477
3477
HFB
6467
3485
Filament
5457
3456
6452
-14V
6453
3458
F453
VideoSupply
6461
3450
+12V_LOT
5458
3455
+14V
3401
VT_SUPPLY
EW_DRIVE
HD
SVM_ROT
1401
+12V_LOT
VideoSupply
EHTinfo
Vbatt
Filament
TO 1351 B1 CRT

A5 FEATURES & CONNECTIVITIES

1251
Vguard
EHTinfo
VDRA
VDRB
EW_DRIVE
SVM_ROT
HFB
HD
3489
3478
7451 TDA8177F
+14V
FLYBACK GENERATOR
THERMAL PROTECTION
-14V
F458
1451
VER. DEFL. COIL
F459
3471

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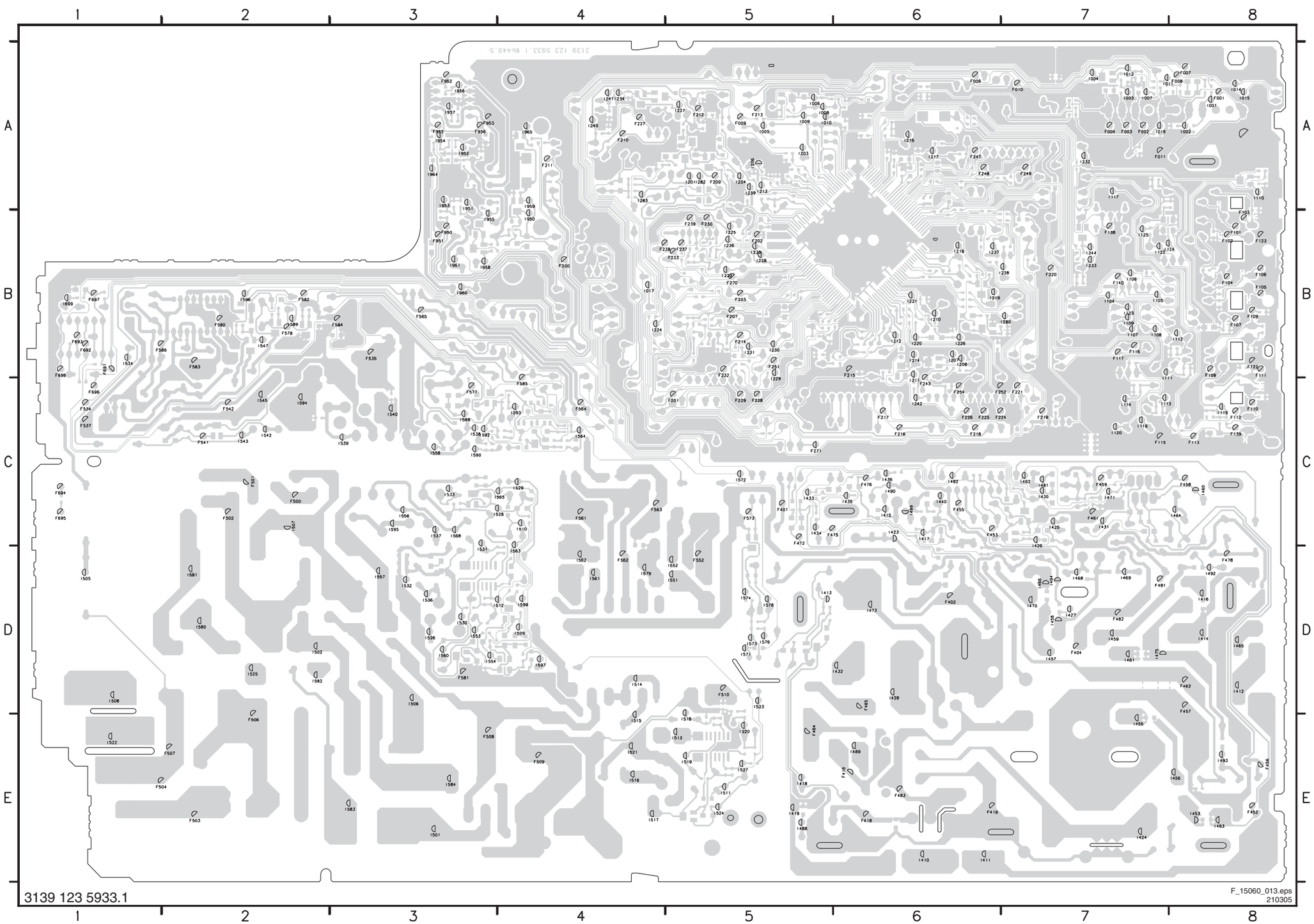
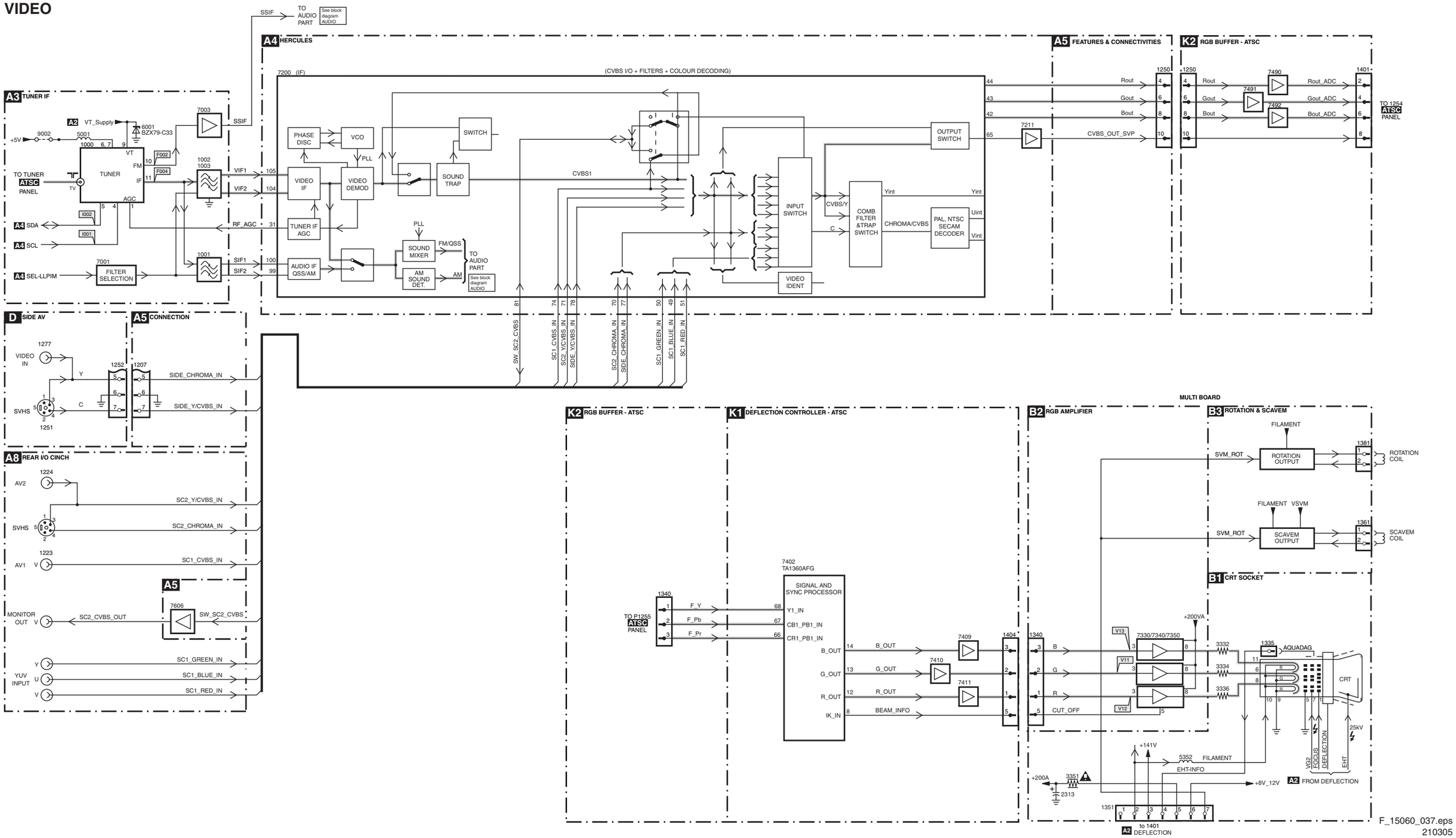
Testpoint Overview Mono Carrier

F001 A8 F002 A7 F003 A7 F004 A7 F005 A8 F006 A6 F007 A8 F008 A8 F009 A5
F010 A7 F011 A7 F101 B8 F102 B8 F103 B8 F104 B8 F105 B8 F106 B8 F107 B8
F108 B8 F109 B8 F110 C8 F111 B8 F112 C8 F113 C8 F115 C7 F116 B7 F117 B7
F122 B8 F123 B8 F138 B7 F139 C8 F140 B7 F200 B4 F201 C5 F202 B5 F203 B5
F207 B5 F209 A5 F210 A4 F211 A4 F212 A5 F213 A5 F214 B5 F215 B6 F216 C6
F217 C6 F218 C6 F219 C7 F220 B7 F221 C7 F224 C6 F225 C6 F226 C6 F227 A4
F228 C5 F229 C5 F230 B5 F232 B5 F233 B5 F234 B4 F237 B5 F238 B4 F239 B5
F243 C6 F247 A6 F248 A6 F249 A7 F251 B5 F252 C6 F253 C6 F254 C6 F255 B5
F270 B5 F271 C5 F300 C5 F401 C5 F402 D6 F404 D7 F416 E6 F418 E6 F419 E6
F455 C6 F456 E8 F457 D8 F458 C8 F459 C7 F461 C7 F462 D8 F463 E6 F464 E5
F465 D6 F472 C5 F473 C5 F475 C5 F476 C6 F478 D8 F481 D7 F482 D7 F483 E6
F500 C2 F501 C2 F502 C2 F503 E2 F504 E1 F506 E2 F507 E2 F508 E3 F509 E4
F510 D5 F523 B3 F535 C1 F537 C1 F538 C1 F541 C2 F542 C2 F561 C4 F562 D4
F563 C4 F564 C4 F565 B3 F573 C5 F577 C3 F578 B2 F579 B2 F580 B2 F581 D3
F582 B2 F583 B2 F584 B3 F585 C4 F586 B1 F588 B3 F589 B3 F590 B3 F591 B3
F592 B3 F593 B3 F594 B3 F596 B3 F597 B3 F691 B1 F692 B1 F693 B1 F694 C1
F695 C1 F696 C1 F697 C1 F698 B1 F699 B1 F890 B3 F950 B3 F951 B3 F952 A3
F953 A3 F954 A3 F955 A3 F956 A3 F957 A3 F958 A3 F959 A4 F960 B3 F961 B3
F964 A3 F965 A4 I001 A8 I002 A8 I003 A7 I004 A7 I005 A5 I006 A5 I007 A7
I008 A5 I009 A5 I010 A5 I011 A7 I012 A7 I014 A8 I015 A8 I016 A7 I017 B4
I104 B7 I105 B7 I106 B7 I107 B7 I108 B7 I109 B7 I110 A8 I111 C7 I112 B8
I113 C7 I114 C7 I116 C7 I117 A7 I119 C8 I120 C7 I122 B7 I123 B7 I124 B8
I125 B7 I201 A5 I203 A5 I204 A5 I206 A5 I207 B6 I208 B6 I210 B6 I211 C6
I212 B6 I213 A5 I214 B6 I215 A6 I217 A6 I218 B6 I219 B6 I220 B6 I221 B6
I222 B5 I224 B4 I225 B5 I226 B6 I227 A5 I228 B5 I229 C5 I230 B5 I231 B5
I232 A7 I233 B7 I234 A4 I235 B5 I236 B5 I237 B6 I238 B7 I239 A5 I240 A4
I241 A4 I242 C6 I243 B7 I244 B7 I245 A5 I247 B6 I248 B5 I249 A7 I254 B7
I280 B7 I282 A5 I283 A4 I410 E6 I411 E6 I412 D8 I413 D5 I414 D8 I415 C6
I416 D8 I417 C6 I418 E5 I419 E5 I423 C6 I424 E7 I425 C7 I426 D7 I427 D7
I428 D6 I430 C7 I431 C7 I432 D6 I433 C5 I434 C5 I435 C6 I436 C6 I440 C6
I453 E8 I455 E7 I456 E8 I457 D7 I458 D7 I459 D7 I460 C8 I461 D7 I463 E8
I464 C8 I465 D8 I466 D7 I468 D7 I469 D7 I470 D7 I471 C7 I473 D6 I475 D7
I476 D7 I478 D7 I481 C7 I482 C6 I488 E5 I489 E6 I490 C6 I492 D8 I493 E8
I494 D7 I499 C6 I501 E3 I502 D2 I505 D1 I506 D3 I507 C2 I508 D1 I509 D4
I510 C4 I511 E5 I512 D4 I513 E5 I514 D4 I515 E4 I516 E4 I517 E4 I518 E5
I519 E5 I520 E5 I521 E4 I522 E1 I523 D5 I524 E5 I525 D2 I526 D3 I527 E5
I528 C4 I529 C4 I530 D3 I531 D3 I532 D3 I533 C3 I534 B1 I536 D3 I537 C3
I538 C3 I539 C3 I540 C3 I542 C2 I543 C2 I545 C2 I547 B2 I551 D5 I552 D5
I553 D3 I554 D3 I556 C3 I557 D3 I558 C3 I560 D3 I561 D4 I562 D4 I563 D4
I564 C4 I565 C4 I568 C3 I571 D5 I572 C5 I573 D5 I574 D5 I576 D5 I578 D5
I579 D4 I580 D2 I581 D2 I582 D2 I583 E3 I584 E3 I588 C3 I589 B2 I590 C3
I592 C3 I593 C4 I594 C2 I595 C3 I596 B2 I597 D4 I599 D4 I699 B1 I950 B4
I951 A3 I952 A3 I953 A3 I954 A3 I955 B3 I956 A3 I957 A3 I958 B3 I959 A4
I960 B3 I961 B3 I964 A3 I965 A4



Block Diagram Video

VIDEO



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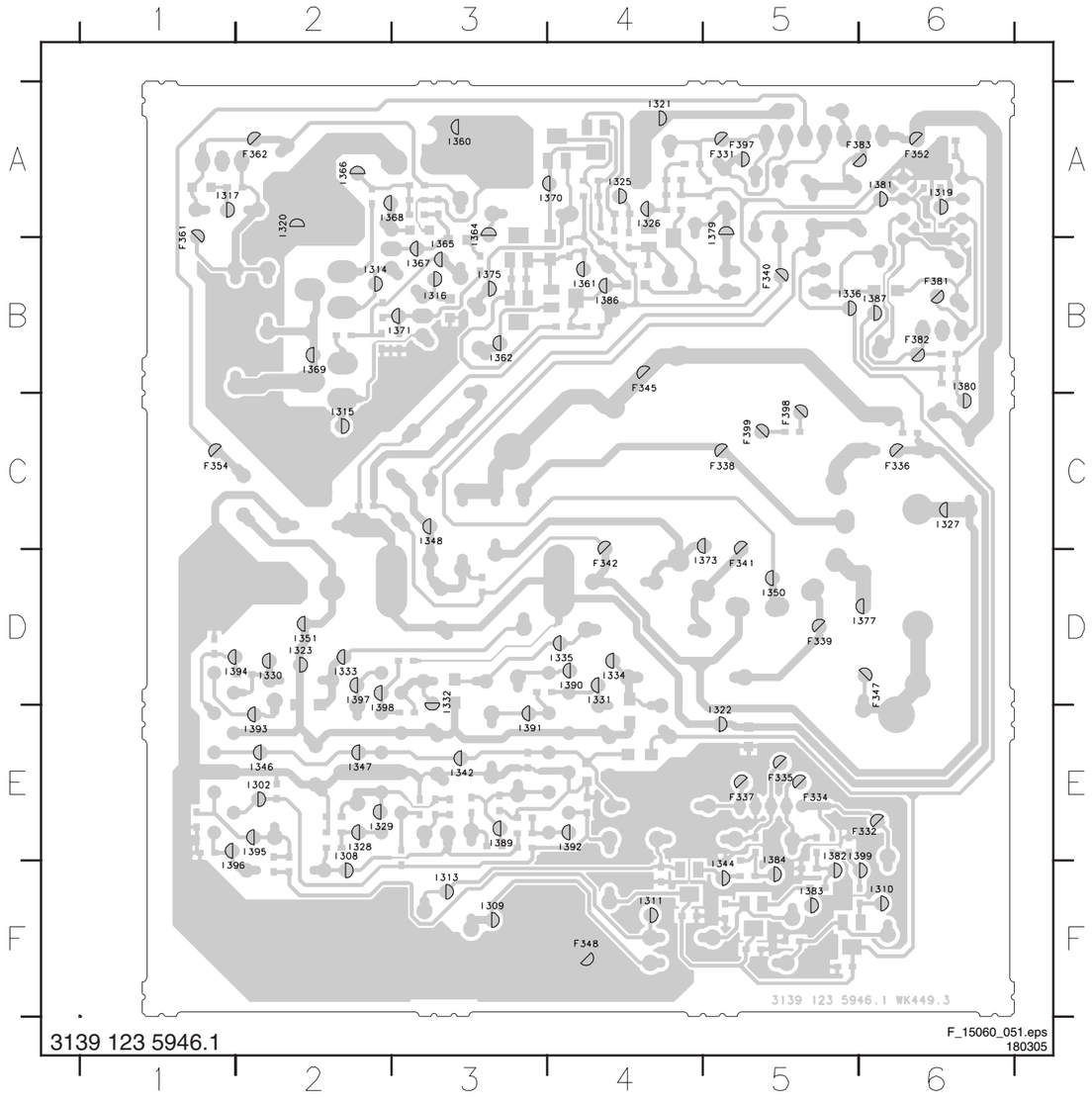
Testpoint Overview CRT Panel (Multi Board)

F331	A5	F339	D5	F352	A6	F397	A5	I311	F4	I320	A2	I328	E2	I335	D4	I350	D5	I366	A2	I375	B3	I384	E5	I393	E2
F332	E6	F340	B5	F354	C1	F398	C5	I313	F3	I321	A4	I329	E2	I336	B5	I351	D2	I367	B3	I377	D6	I386	B4	I394	D1
F334	E5	F341	D5	F361	A1	F399	C5	I314	B2	I322	E5	I330	D2	I342	E3	I360	A3	I368	A2	I379	A5	I387	B6	I395	E2
F335	E5	F342	D4	F362	A2	I302	E2	I315	C2	I323	D2	I331	D4	I344	F5	I361	B4	I369	B2	I380	B6	I389	E3	I396	F1
F336	C6	F345	B4	F381	B6	I308	E2	I316	B3	I325	A4	I332	D3	I346	E2	I362	B3	I370	A4	I381	A6	I390	D4	I397	D2
F337	E5	F347	D6	F382	B6	I309	F3	I317	A1	I326	A4	I333	D2	I347	E2	I364	A3	I371	B3	I382	E5	I391	E3	I398	E2
F338	C5	F348	F4	F383	A5	I310	F6	I319	A6	I327	C6	I334	D4	I348	C3	I365	B3	I373	D5	I383	F5	I392	E4	I399	E6



3139 123 5946.1

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Personal Notes:

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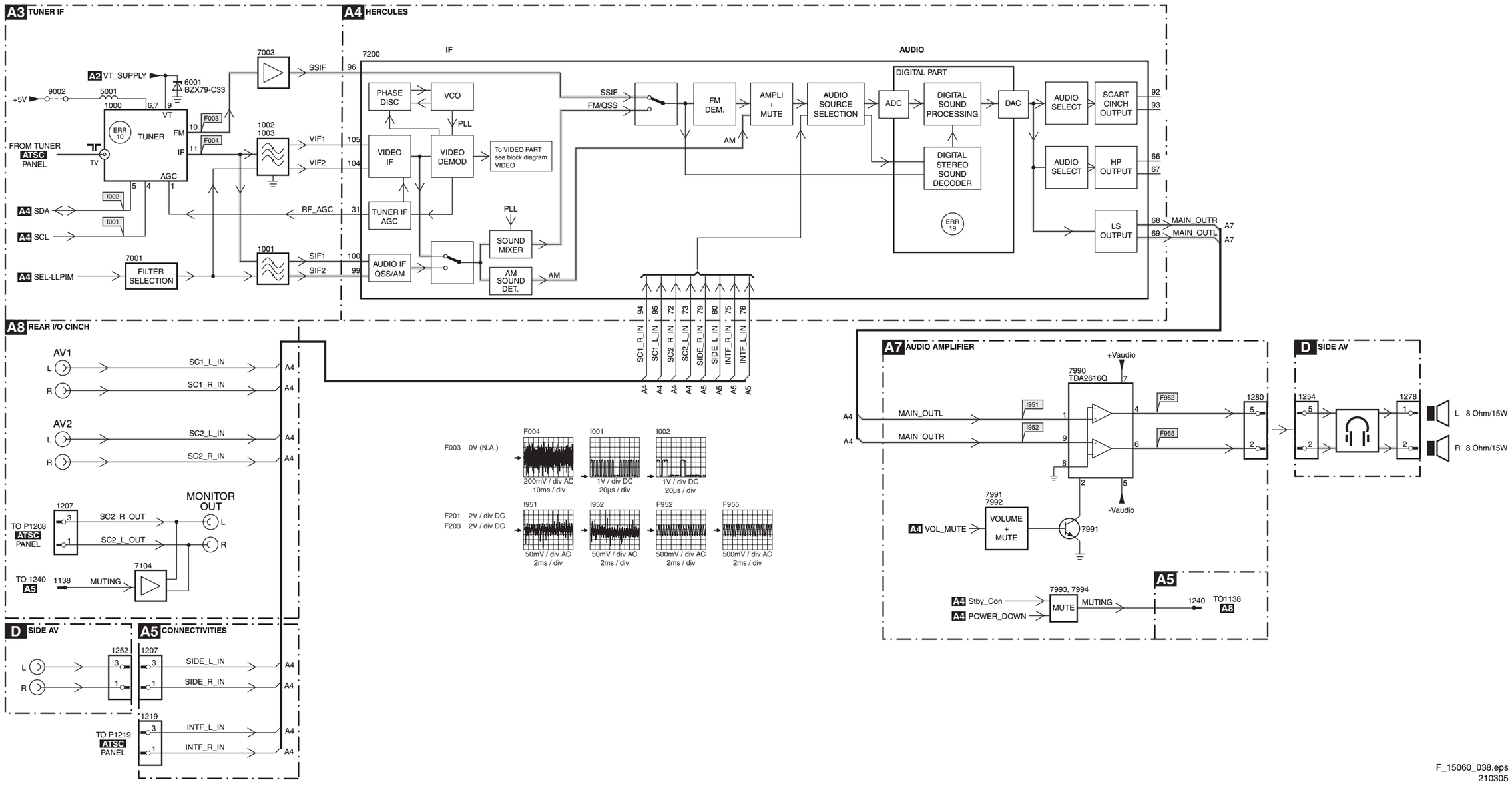
131004

Block Diagram Audio

AUDIO



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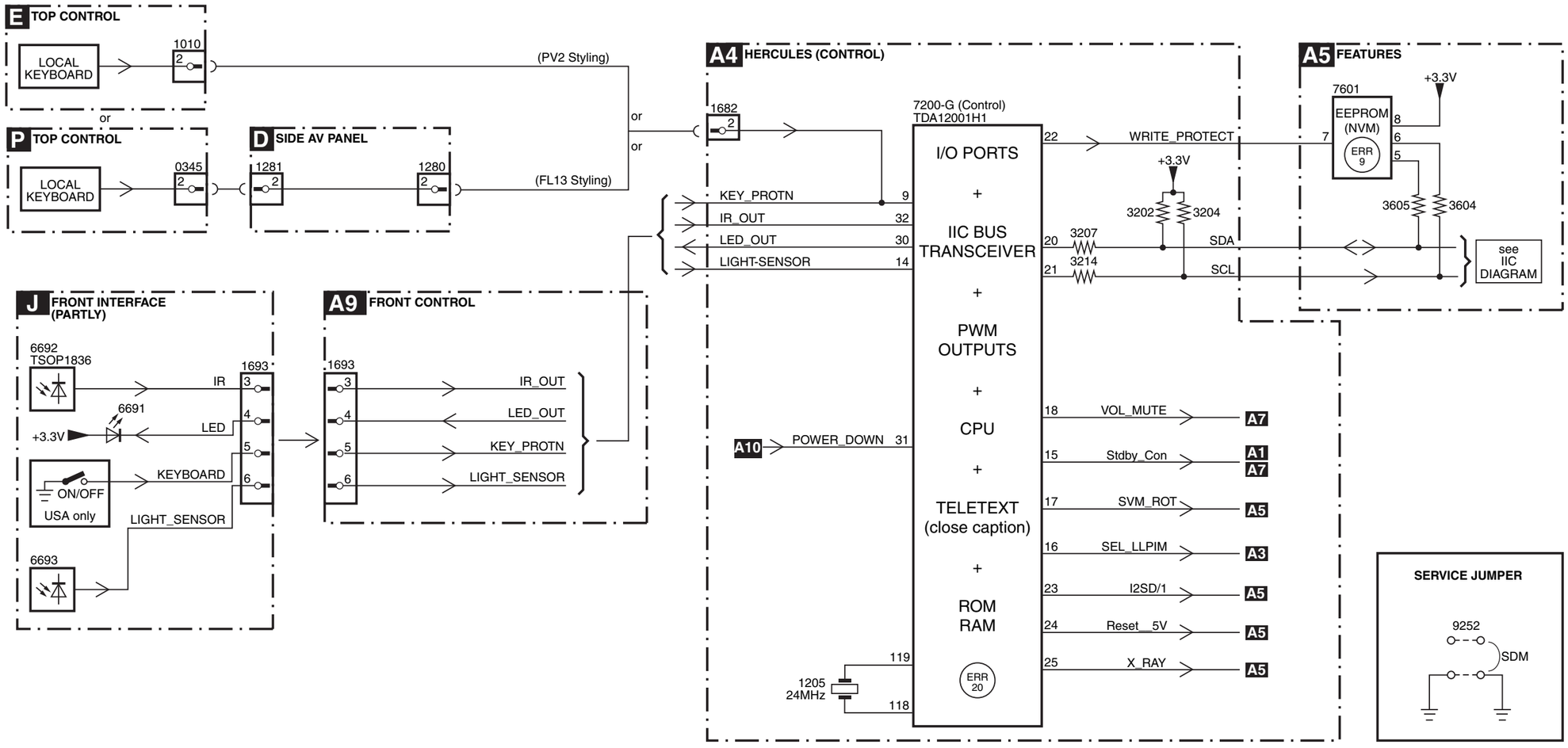
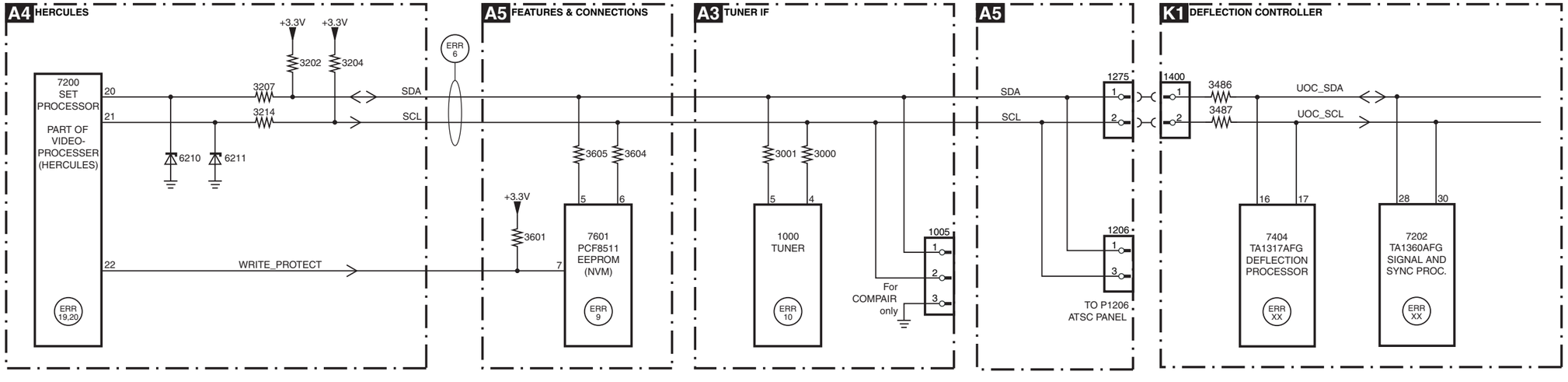
Block Diagram Control & I2C Overview

CONTROL



I2C BUS INTERCONNECTION DIAGRAM



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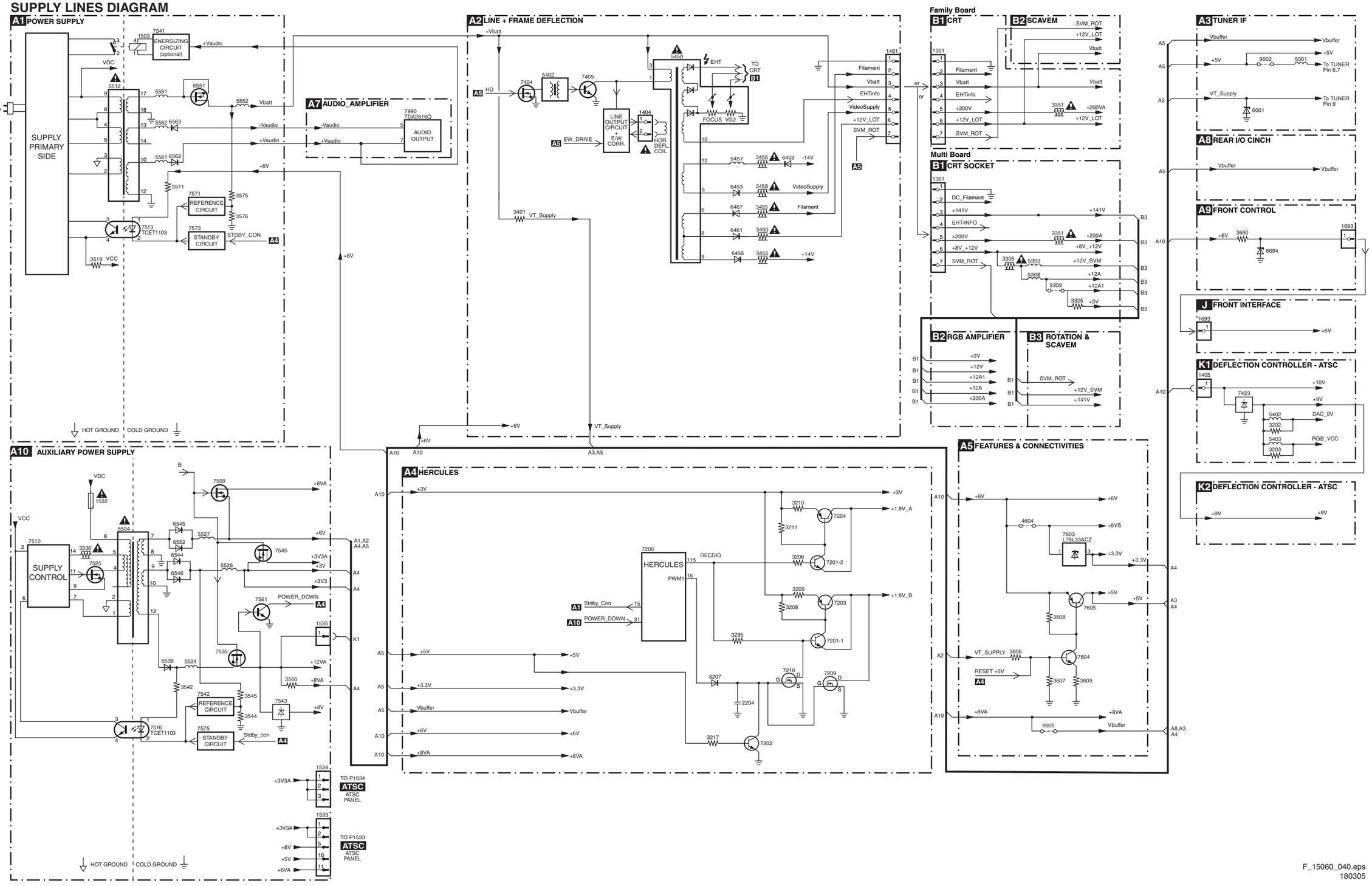
Supply Lines Overview



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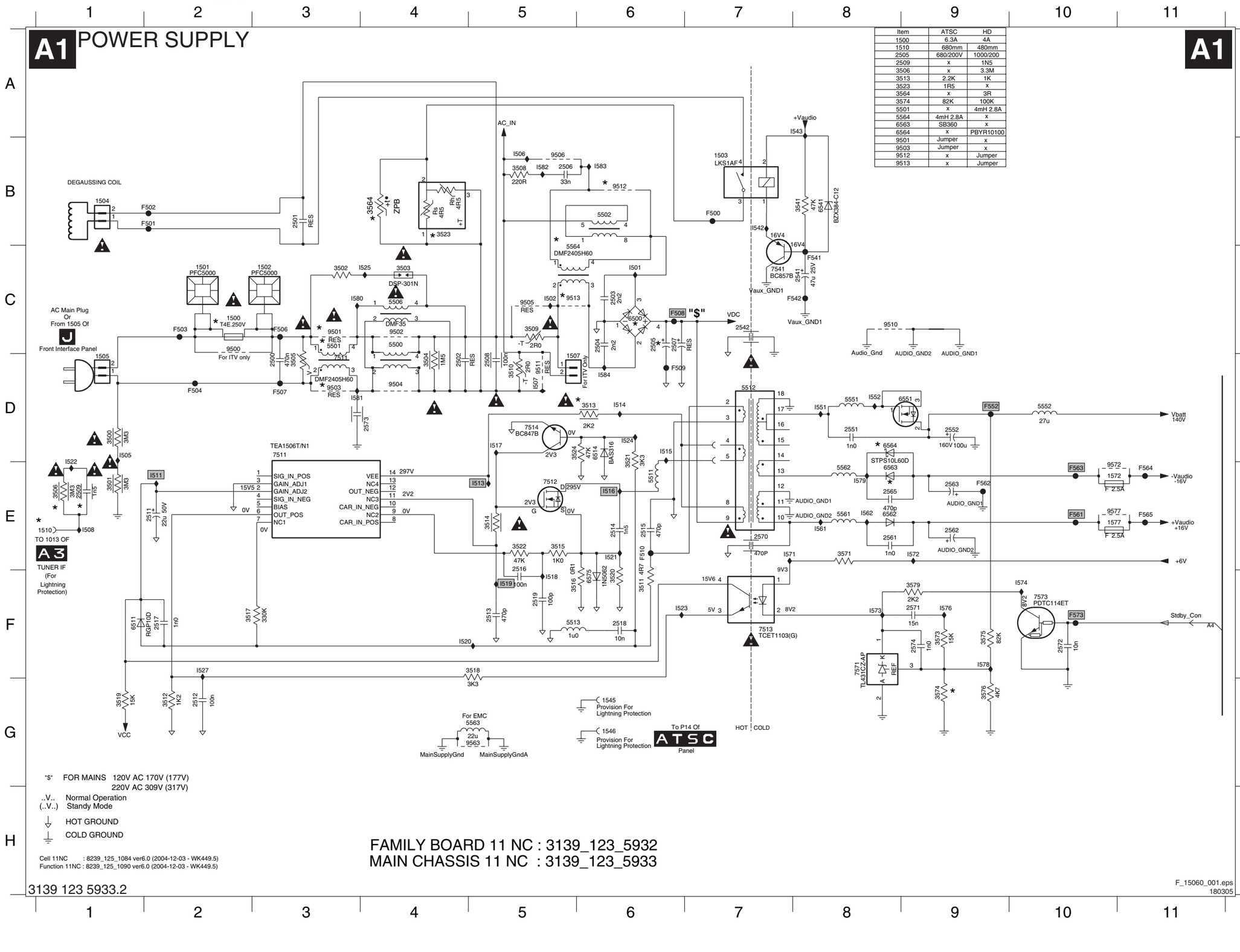
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply



Item	ATSC	HD
1500	6.3A	4A
1510	680mm	480mm
2505	680/200V	1000/200
2509	x	1N5
3506	x	3.3M
3513	2.2K	1K
3523	1R5	x
3564	x	3R
3574	82K	100K
5501	x	4mH 2.8A
5564	4mH 2.8A	x
6563	SB360	x
6564	x	PBYR10100
9501	Jumper	x
9503	Jumper	x
9512	x	Jumper
9513	x	Jumper

1500 C2 F501 B2
1501 C2 F502 B2
1502 C3 F503 C2
1503 B7 F504 D2
1504 B1 F506 C3
1505 D1 F507 D3
1507 D5 F508 C6
1510 E1 F509 D6
1545 G6 F510 E6
1546 G6 F541 C8
1572 E10 F542 C8
1577 E10 F552 D9
2500 D3 F561 E10
2501 B3 F562 E9
2502 D4 F563 E10
2503 C6 F564 E11
2504 C6 F565 E11
2505 C6 F573 F10
2506 B5 I501 C6
2507 C6 I502 C5
2508 D5 I505 D1
2509 E1 I506 B5
2511 E2 I507 D5
2512 G2 I508 E1
2513 F5 I511 E2
2514 E6 I513 E5
2515 E6 I514 D6
2516 F5 I515 D6
2517 F2 I516 E6
2518 F6 I517 D5
2519 F5 I518 F5
2541 C8 I519 F5
2542 C7 I520 F4
2551 D8 I521 E6
2552 D9 I522 D1
2561 E8 I523 F6
2562 E9 I524 D6
2563 E9 I525 C4
2565 E8 I527 F2
2570 E7 I542 B7
2571 F9 I543 A8
2572 F10 I551 D8
2573 D4 I552 D8
2574 F9 I561 E8
3500 D1 I562 E8
3501 E1 I571 E7
3502 C3 I572 E9
3503 C4 I573 F8
3504 D4 I574 F10
3505 D3 I576 F9
3506 E1 I578 F9
3508 B5 I579 E8
3509 C5 I580 C3
3510 D5 I581 D3
3511 F6 I582 B5
3512 G2 I583 B6
3513 D6 I584 D6
3514 E5
3515 E5
3516 F5
3517 F2
3518 F5
3519 G1
3520 F6
3521 D6
3522 E5
3523 B4
3524 D5
3541 B8
3564 B4
3571 E8
3573 F9
3574 G9
3575 F9
3576 G9
3579 F9
5500 C4
5501 C3
5502 B6
5506 C4
5511 E6
5512 D7
5513 F5
5551 D8
5552 D10
5561 E8
5562 E8
5563 G5
5564 B5
6500 C6
6511 F1
6514 D6
6541 B8
6551 D9
6562 E8
6563 E8
6564 D8
6575 F6
7511 D3
7512 E5
7513 F7
7514 D5
7541 C7
7571 F8
7573 F10
9500 C2
9501 C3
9502 C4
9503 D3
9504 D4
9505 C5
9506 B5
9510 C8
9511 D5
9512 B6
9513 C5
9563 G5
9572 E10
9577 E10
F500 B7

Mono Carrier: Deflection

A2 LINE + FRAME DEFLECTION

Cell 11NC : 8239_125_1084 ver6.0 (2004-12-03 - WK449.5)
Function 11NC : 8239_125_1091 ver6.0 (2004-12-03 - WK449.5)

FAMILY BOARD 11NC : 3139_123_5932
MAIN CHASSIS 11NC : 3139_123_5933

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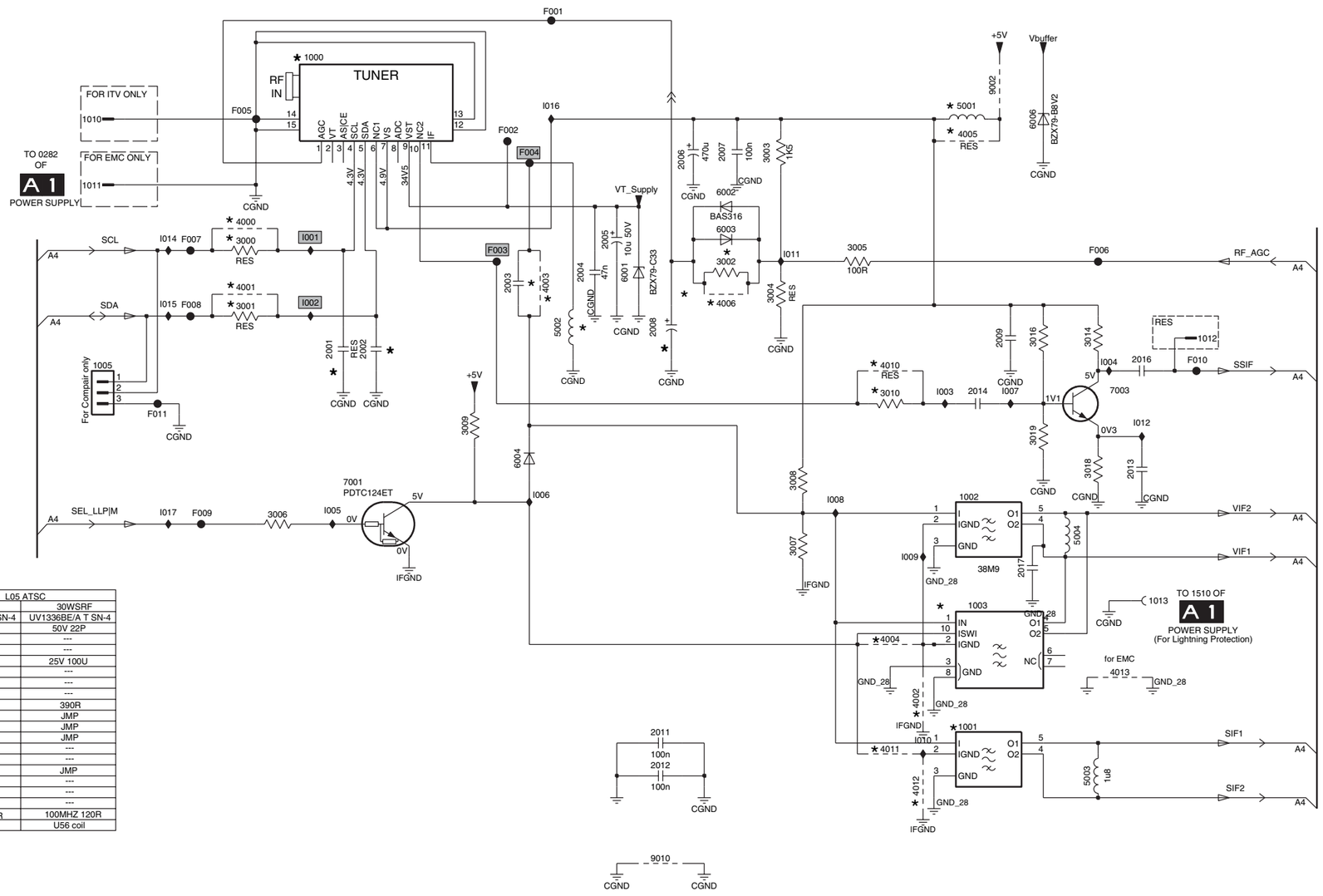
3139 123 5933.2

1401 A2 6481 C2
1402 B4 6482 G2
1403 B8 6483 G2
1404 B6 6484 G5
1405 C8 6485 E3
1406 C8 6486 D4
1451 F10 6487 D6
2404 A6 6488 E9
2407 G6 6489 D9
2409 C2 6490 E9
2410 E7 6491 E11
2411 D4 6492 B10
2412 D5 7404 E2
2413 D5 7405 C4
2416 D5 7406 F4
2417 C6 7407 E10
2418 C6 7408 B9
2419 D6 7410 E3
2421 B3 7451 F8
2422 B3 9402 B6
2423 D2 9411 B5
2424 E7 9432 G11
2425 B11 9435 E11
2426 C10 9440 G4
2431 B6 9442 C8
2432 F7 9476 C9
2433 B3 9484 H4
2435 B9 9489 F6
2436 D10 9490 F6
2448 D8 F401 B1
2449 D8 F402 A1
2451 B9 F404 B2
2454 D9 F416 B6
2458 D9 F418 C4
2459 E8 F419 D4
2460 E8 F452 C10
2461 D9 F453 D10
2462 G7 F455 B1
2463 G7 F456 E9
2464 G8 F457 E7
2465 G7 F458 F9
2466 E9 F459 F9
2467 G7 F461 G6
2468 G9 F462 A9
2469 B9 F464 B6
2470 F10 F465 C6
2471 G1 F466 B6
2472 G3 F467 C6
2473 G2 F472 B10
2474 B10 F475 E1
2477 B10 F476 F1
2478 B10 F478 D10
2488 D2 F481 B9
2491 C11 F482 E10
2492 B8 F483 A5
2493 C9 I410 E4
2494 D8 I411 E4
2495 F5 I412 E5
2496 F4 I413 E2
2497 E2 I414 E6
2499 E10 I415 F4
3401 B2 I416 E7
3402 E2 I417 F5
3408 E2 I418 C3
3412 B5 I419 D2
3413 B6 I423 F5
3414 E3 I424 B3
3415 E4 I425 C9
3416 D4 I426 C10
3418 F3 I427 C10
3419 E4 I428 D6
3421 C1 I430 G10
3424 A3 I431 E9
3425 B3 I432 D6
3426 G1 I433 G2
3427 G1 I434 G2
3428 G2 I435 G2
3431 F3 I436 G1
3432 G11 I440 E9
3433 E5 I453 C9
3434 G11 I455 C7
3435 E11 I456 C8
3436 G2 I457 D8
3437 G2 I458 C8
3438 G5 I459 D8
3439 G5 I460 E8
3440 G4 I461 D7
3441 E3 I462 F7
3442 C8 I463 G8
3443 E4 I464 G9
3450 D8 I465 E5
3451 E6 I466 D8
3453 B8 I468 C10
3455 E8 I469 B8
3456 C8 I470 C9
3458 D8 I471 F7
3459 C9 I473 D5
3460 C10 I475 E8
3461 G6 I481 G10
3462 B9 I482 E10
3463 G7 I488 C2
3466 G9 I489 B6
3467 G10 I490 F4
3468 G10 I492 D8
3469 C9 I493 E8
3471 G6 I494 B10
3472 G6 I499 G4
3473 F5
3474 B10
3477 B10
3478 F6
3480 E5
3481 D6
3485 C10
3486 B8
3488 F4
3489 F6
3490 C3
3491 A8
3492 A8
3493 E7
3496 E11
3497 E11
3499 F3
4401 G11
4418 F3
4434 F10
4495 G11
5401 B6
5402 C3
5408 D6
5409 C5
5450 B7
5452 D10
5456 A4
5457 C8
5458 D8
5459 E6
6403 E7
6404 C5
6434 G11
6442 C9
6449 G10
6452 C9
6453 D8
6456 E8
6457 E7
6458 G10
6461 D8
6464 E3
6466 B8
6467 C10
6471 F4
6476 C9
6480 B9

Mono Carrier: Tuner IF

A3 TUNER IF



ITEM NO	HD		L05 ATSC	
SIZE	27VRF	30WSRF	27VRF	30WSRF
1000	V+U PLL F MN	V+U PLL F MN	UV1336BE/A T SN-4	UV1336BE/A T SN-4
2001	50V 22P	50V 22P	50V 22P	50V 22P
2002	---	---	---	---
2003	---	---	---	---
2008	25V 100U	25V 100U	25V 100U	25V 100U
3000	---	---	---	---
3001	---	---	---	---
3002	---	---	---	---
3010	390R	390R	390R	390R
4000	JMP	JMP	JMP	JMP
4001	JMP	JMP	JMP	JMP
4003	JMP	JMP	JMP	JMP
4004	---	---	---	---
4005	---	---	---	---
4006	JMP	JMP	JMP	JMP
4010	---	---	---	---
4011	---	---	---	---
4012	---	---	---	---
5001	100MHZ 120R	100MHZ 120R	100MHZ 120R	100MHZ 120R
5002	U39 coil	U39 coil	U56 coil	U56 coil

FAMILY BOARD 11 NC : 3139_123_5932
MAIN CHASSIS 11 NC : 3139_123_5933

Cell 11NC : 8239_125_1092 ver6.0 (2004-12-03 - WK449.5)
Function 11NC : 8239_125_1085 ver6.0 (2004-12-03 - WK449.5)

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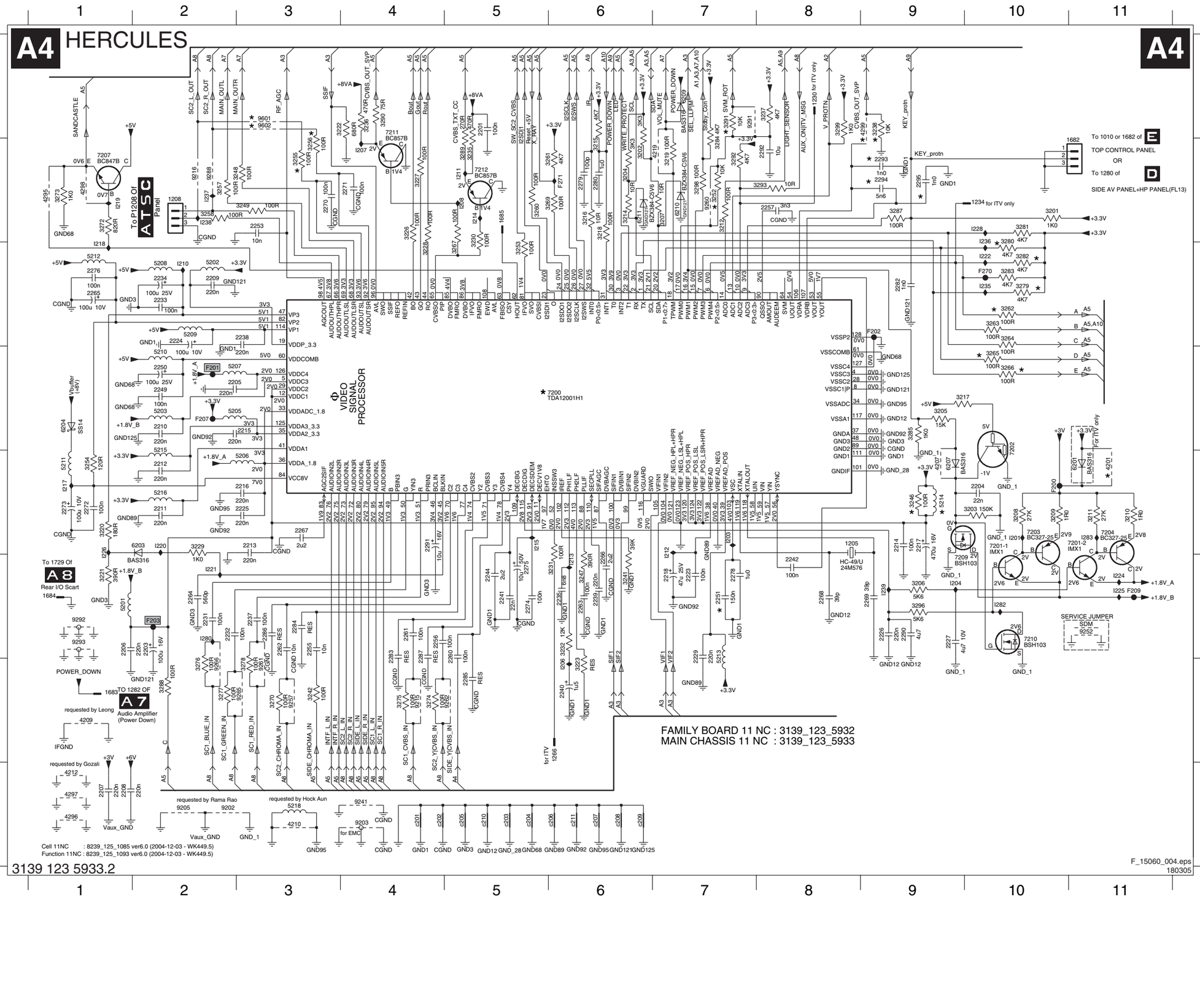
1000 A4
1001 E9
1002 D9
1003 E9
1005 C3
1010 B3
1011 B3
1012 C10
1013 E10
2001 C4
2002 C5
2003 C6
2004 B6
2005 B6
2006 B7
2007 B7
2008 C7
2009 C9
2011 F7
2012 F7
2013 D10
2014 C9
2016 C10
2017 D9
3000 B4
3001 C4
3002 B7
3003 B7
3004 C7
3005 B8
3006 D4
3007 D8
3008 D8
3009 C5
3010 C8
3014 C9
3016 C9
3018 D9
3019 D9
4000 B4
4001 C4
4002 E8
4003 C6
4004 E8
4005 B9
4006 C7
4010 C8
4011 F8
4012 F8
4013 E10
5001 A9
5002 C6
5003 F9
5004 D9
6001 B6
6002 B7
6003 B7
6004 D6
6006 A9
7001 D5
7003 C10
9002 A9
9010 F7
F001 A6
F002 B6
F003 B6
F004 B6
F005 A4
F006 B10
F007 B4
F008 C4
F009 D4
F010 C10
F011 C3
I001 B4
I002 C4
I003 C9
I004 C10
I005 D5
I006 D6
I007 C9
I008 D8
I009 D8
I010 F8
I011 B8
I012 C10
I014 B3
I015 C3
I016 A6
I017 D3

Mono Carrier: Hercules


A4 HERCULES
A4
VIDEO SIGNAL PROCESSOR
7200 TDA12001H1
ATSC Panel
To P1208 Of
To 1729 Of A8 Rear I/O Scart
TO 1282 OF A7 Audio Amplifier (Power Down)
To 1010 or 1682 of E TOP CONTROL PANEL OR To 1280 of D SIDE AV PANEL+HP PANEL(FL13)
1234 for ITV only
1230 for ITV only
for ITV
SERVICE JUMPER SDM 9252
requested by Leong
requested by Gozali
requested by Rama Rao
requested by Hock Aun
POWER_DOWN
FAMILY BOARD 11 NC : 3139_123_5932
MAIN CHASSIS 11 NC : 3139_123_5933
Cell 11NC : 8239_125_1085 ver6.0 (2004-12-03 - WK449.5)
Function 11NC : 8239_125_1093 ver6.0 (2004-12-03 - WK449.5)
3139 123 5933.2
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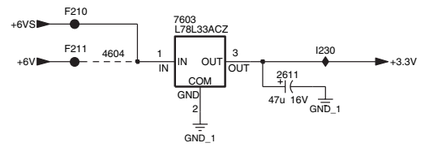
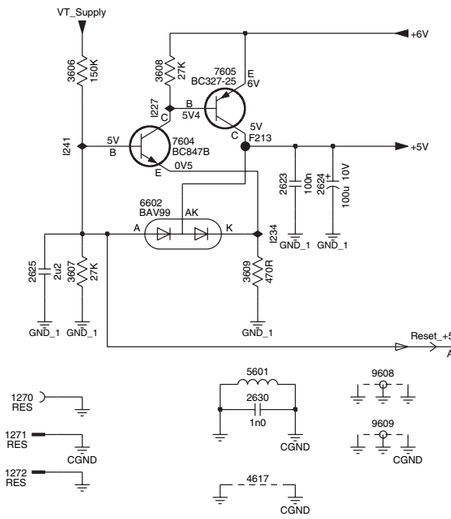
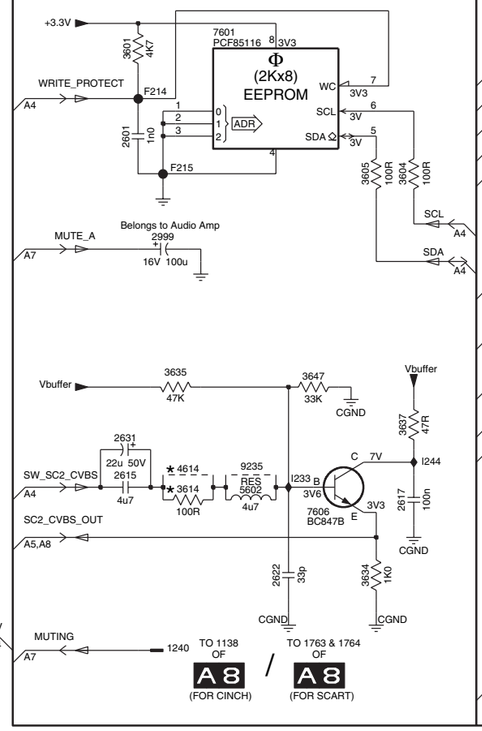
1205 E8	3216 B6	6209 A7
1208 B2	3217 D9	6210 B7
1230 A8	3218 B6	6211 B6
1234 B10	3219 B7	7200 D6
1266 G6	3220 E1	7201-1 E10
1682 B11	3221 F1	7201-2 E10
1683 G1	3222 A4	7202 D10
1684 F1	3223 G6	7203 E10
1685 B5	3226 B4	7204 E11
2201 A5	3227 B4	7207 B1
2203 F2	3228 C4	7209 F9
2204 E10	3229 E2	7210 F10
2205 D2	3230 B5	7211 A4
2206 F1	3231 F6	7212 B5
2207 H1	3232 F6	9202 H2
2208 H1	3235 B5	9203 H4
2209 C2	3236 A4	9205 H2
2210 D2	3237 A8	9215 G4
2211 E2	3238 A9	9216 B2
2212 E2	3241 F6	9241 H4
2213 E3	3242 G3	9257 G3
2214 E9	3246 E9	9260 B7
2215 D3	3247 F6	9261 G3
2216 E3	3248 B3	9262 G5
2217 E9	3249 B3	9265 G3
2218 F7	3252 B7	9266 G2
2223 F7	3253 C5	9288 B2
2224 C2	3254 E1	9291 A7
2225 E3	3255 B3	9292 F1
2226 F9	3256 B3	9293 F1
2227 F9	3257 B2	9601 A3
2229 F7	3258 B2	9602 A3
2231 F2	3260 B5	F200 E10
2232 F2	3261 B6	F201 D2
2233 C2	3262 C10	F202 C9
2234 C2	3263 C10	F203 F2
2235 F6	3264 C10	F207 D2
2237 F3	3265 D10	F209 F11
2238 C3	3266 D10	F270 C10
2239 F6	3267 C5	F271 B6
2240 G6	3269 B6	I201 E10
2241 F5	3270 G3	I203 E7
2242 F8	3272 B1	I204 F9
2244 F5	3273 B1	I206 G6
2249 D2	3274 G4	I207 B4
2250 D2	3275 G4	I208 B5
2251 F7	3276 G2	I210 C2
2253 B3	3277 G2	I211 B5
2255 F3	3278 G3	I212 E7
2256 F4	3279 C10	I213 F6
2257 B8	3280 C10	I214 B5
2260 F5	3281 B10	I215 E5
2261 F4	3282 C10	I217 E1
2262 F3	3283 C10	I218 C1
2263 F6	3284 B7	I219 B1
2264 F2	3285 D9	I220 E2
2265 C1	3287 B9	I221 F2
2266 F6	3288 G2	I222 C10
2267 E3	3289 B5	I224 F11
2268 F8	3290 A4	I225 F11
2269 F9	3291 A7	I226 E1
2270 B3	3292 B7	I228 B10
2271 B4	3293 B8	I235 C10
2272 E1	3296 F9	I236 B10
2273 E1	3298 B7	I237 B2
2274 F5	3299 A8	I238 B2
2275 F5	4201 E11	I239 F9
2276 C1	4207 E9	I280 F2
2278 F7	4209 G1	I282 F10
2279 B6	4210 H3	I283 E11
2280 B6	4212 H1	c201 H4
2282 C9	4219 B7	c202 H4
2283 F4	4295 B1	c203 H5
2284 F3	4296 H1	c204 H5
2285 G5	4297 H1	c205 H5
2286 F3	4298 B1	c206 H6
2287 F4	4299 A9	c207 H6
2290 F9	5201 F1	c208 H6
2291 E4	5202 C2	c209 H6
2292 B8	5203 D2	c210 H5
2293 B9	5205 D2	c211 H6
2294 B9	5206 E3	
2295 B9	5207 D2	
3201 B10	5208 C2	
3202 B6	5209 C2	
3203 E10	5210 D2	
3204 B6	5211 E1	
3205 D9	5212 C1	
3206 F9	5213 F7	
3207 B7	5214 E9	
3208 E10	5215 E2	
3209 E10	5216 E2	
3210 E11	5218 H3	
3211 E11	6201 E11	
3212 B7	6203 E2	
3214 B6	6204 D1	
3215 B6	6207 E9	

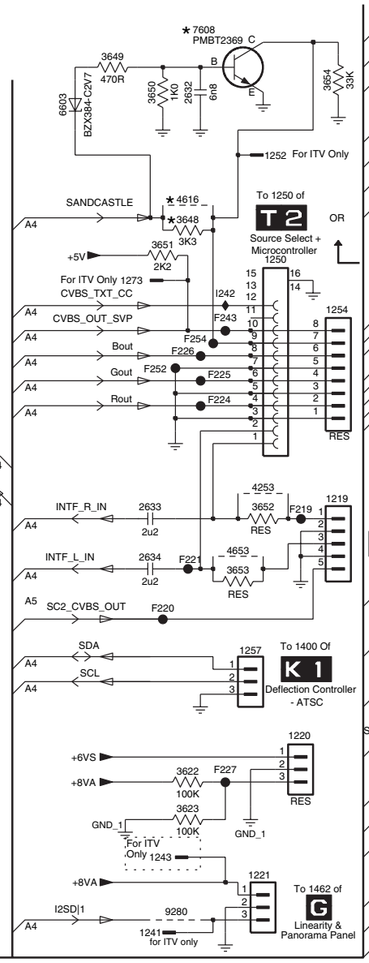
Mono Carrier: Features & Connectivities

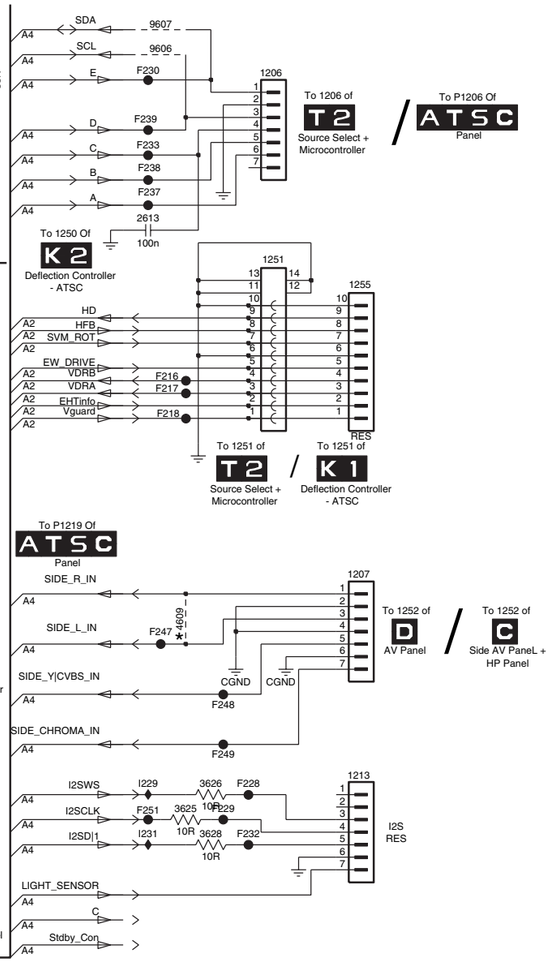
A5 FEATURES & CONNECTIVITIES











REGION	NAFTA	
SIZE	27VRF-HD	30WSRF-HD
3614	470R	470R
3648	2K2	2K2
4609	---	---
4614	---	---
4616	---	---

FAMILY BOARD 11 NC : 3139_123_5932
MAIN CHASSIS 11 NC : 3139_123_5933

3139 123 5933.2

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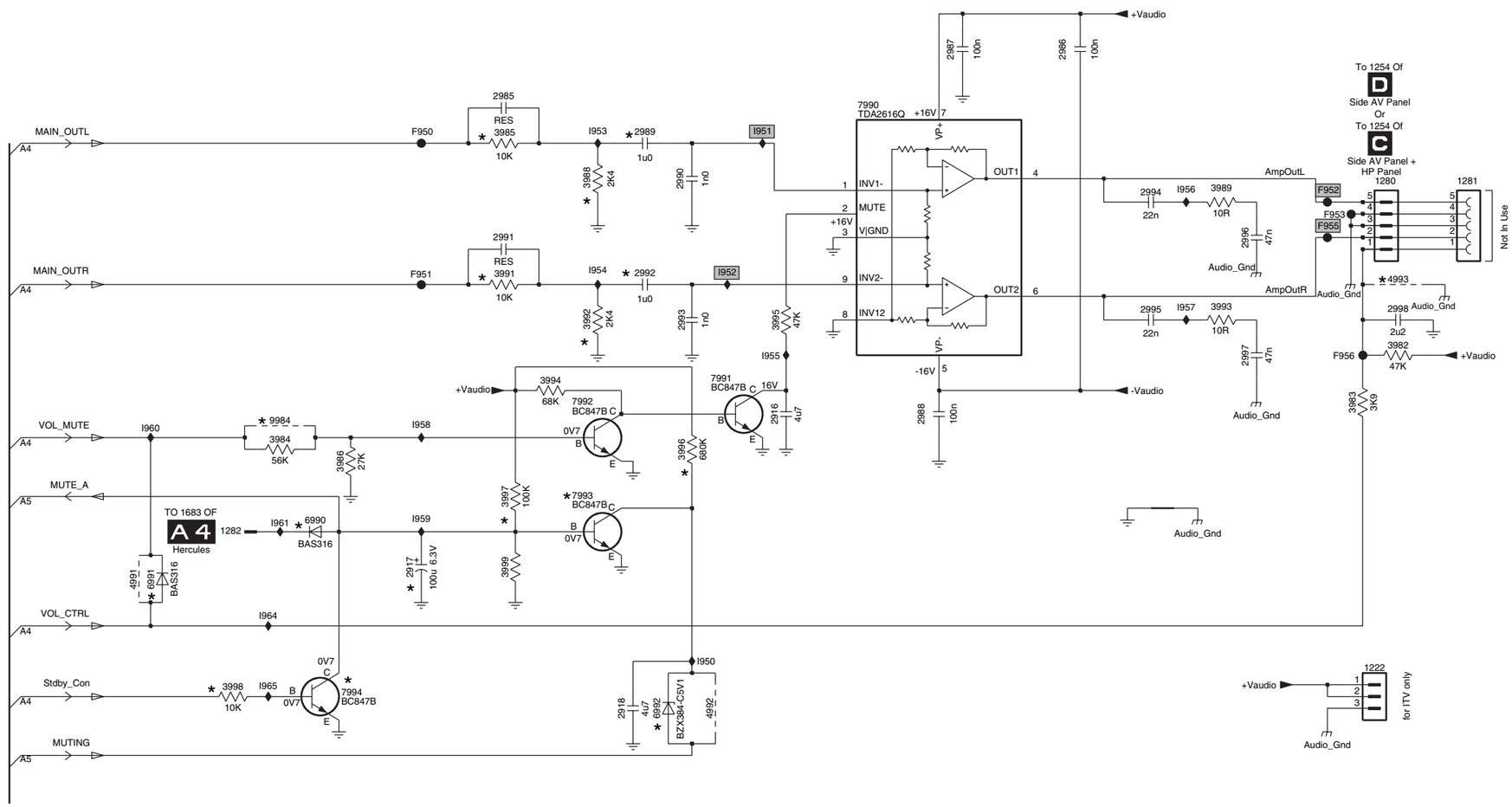
1206 A10
1207 D10
1213 E10
1219 D8
1220 E8
1221 F8
1240 F5
1241 F7
1243 F7
1250 B8
1251 B10
1252 B8
1254 C8
1255 C10
1257 E8
1270 F1
1271 F1
1272 G1
1273 C7
2601 C4
2611 B3
2613 B9
2615 E4
2617 E6
2620 C3
2621 C3
2622 F5
2623 E3
2624 E3
2625 E1
2630 F3
2631 E4
2632 A7
2633 D7
2634 D7
2999 D5
3601 C4
3604 C6
3605 C6
3606 D2
3607 E2
3608 D2
3609 E3
3614 E5
3622 E7
3623 F7
3625 F9
3626 E10
3628 F10
3634 F6
3635 D5
3637 E6
3647 D6
3648 B7
3649 A7
3650 A7
3651 B7
3652 D8
3653 D8
3654 A8
4253 D8
4604 B2
4609 D9
4612 C2
4614 E5
4616 B7
4617 G3
4653 D8
5601 F3
5602 E5
6602 E2
6603 B7
7601 B5
7603 B2
7604 E2
7605 D2
7606 E5
7608 A7
9235 E5
9280 F7
9605 C3
9606 A9
9607 A9
9608 F3
9609 F3
F210 B2
F211 B2
F212 C3
F213 E3
F214 C5
F215 C5
F216 C9
F217 C9
F218 C9
F219 D8
F220 D7
F221 D7
F224 C8
F225 C8
F226 C7
F227 E8
F228 E10
F229 F10
F230 A9
F232 F10
F233 B9
F237 B9
F238 B9
F239 B9
F243 C8
F247 E9
F248 E10
F249 E10
F251 F9
F252 C7
F254 C7
I227 E2
I229 E9
I230 B3
I231 F9
I232 C3
I233 E5
I234 E3
I240 C2
I241 E1
I242 C8
I244 E6

Mono Carrier: Audio Amplifier

A7 AUDIO AMPLIFIER



REGION	NAFTA			
SIZE	26WSRF-ATSC	30WSRF-ATSC	27VSRF-ATSC	32VSRF-ATSC
6991	---	---	---	---
6992	---	---	---	---
9984	---	---	---	---
3998	---	---	---	---
7994	---	---	---	---
6990	---	---	---	---
2917	---	---	---	---
3997	---	---	---	---
7993	---	---	---	---
3996	---	---	---	---
3985	22K	22K	22K	22K
3991	22K	22K	22K	22K
3988	5K6	5K6	5K6	5K6
3992	5K6	5K6	5K6	5K6
2989	2U2	2U2	2U2	2U2
2992	2U2	2U2	2U2	2U2
4993	JMP	JMP	JMP	JMP

FAMILY BOARD 11NC : 3139_123_5932
MAIN CHASSIS 11NC : 3139_123_5933

3139 123 5933.2

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180305

1222 E10
1280 B10
1281 B10
1282 D3
2916 D6
2917 E4
2918 E5
2985 B4
2986 A8
2987 A7
2988 D7
2989 B5
2990 B6
2991 C4
2992 C5
2993 C6
2994 B8
2995 C8
2996 C9
2997 C9
2998 C10
3982 C10
3983 D10
3984 D3
3985 B4
3986 D4
3988 B5
3989 B9
3991 C4
3992 C5
3993 C9
3994 C5
3995 C6
3996 D6
3997 D5
3998 E3
3999 E5
4991 E2
4992 E6
4993 C10
6990 D3
6991 E2
6992 E5
7990 B7
7991 C6
7992 D5
7993 D5
7994 E4
9984 D3
F950 B4
F951 C4
F952 B9
F953 B10
F955 C9
F956 C10
I950 E6
I951 B6
I952 C6
I953 B5
I954 C5
I955 C6
I956 B9
I957 C9
I958 D4
I959 D4
I960 D2
I961 D3
I964 E3
I965 E3

Mono Carrier: Rear I/O Cinch

A8 REAR I/O CINCH

A8

ITV RES 1236

F101 3101 I117 SC2_CVBS_OUT A5

1101 68R

7104-2 IMX1 0V B 0V2 E — I124 3173 4K7 — I122 3174 4K7 — I125 7104-1 IMX1 0V B 0V2 C E

From 1240 OF A5 Features & Connectivities 1138

MONITOR OUTPUT 1223-1

L — F102 3103 150R — I108 2105 10u F117 SC2_L_OUT A4

R — F103 3105 150R — I107 2106 10u F116 SC2_R_OUT A4

V

2107 390p 2103 330p 3104 220K

2108 390p 2104 330p 3106 220K

1102 1103

Vbuffer — 3170 47K — 8V2 C B 8V2 — 7105 BC847B E 2V — I110 2138 100u 10V

3172 47K 3171 1K0

YUV INPUT 1223-2

U — F104 — 3112 RES 9112 — I104 SC1_GREEN_IN A4

V — F105 — 3114 RES 9114 — I105 SC1_BLUE_IN A4

Y — F122 — F106 — 3116 RES 9116 — I106 SC1_RED_IN A4

1104 1105 1106

3169 75R 3167 75R 3168 75R

for ITV 1227 F115

for ITV 1229

SC2_CHROMA_IN A4

SC2_Y|CVBS_IN A4

SC2_L_IN A4

SC2_R_IN A4

3135 75R

1137

F112 1113 F139 4116

F113 3130 75R 4130 3129 75R 6132 RES 1110

AV2 1224

15 L — 14 R — 13 V — 16

I119

F110 3131 150R 1111

F111 3133 150R 1112

I116 2132 50V 2u2 I113 3132 47K 2131 330p

I120 2134 50V 2u2 I114 3134 47K 2133 330p

4104 RES 2136 390p 2137 390p

1228 For ITV 1 2 3 4 5 6

To 1228 Of T2 Source Select + Microcontroller

1153 1154 1155 F140 4145

SC1_CVBS_IN A4

AV1 1223-3

L — F107 — 1107 6106 BZX284-C6V8 — 3121 75R

R — F108 — 1108 4105 RES 2126 390p 2122 330p — 3123 150R — I111 2123 2u2 50V I123 SC1_L_IN A4 — 3124 47K

V — F123 — F109 — 1109 2127 390p 2124 330p — 3125 150R — I112 2125 2u2 50V I109 SC1_R_IN A4 — 3126 47K

11 10 9 12

for ITV only 1262 F138 1 2 3 4 5 6 7

AUX_ON|ITV_MSG A4

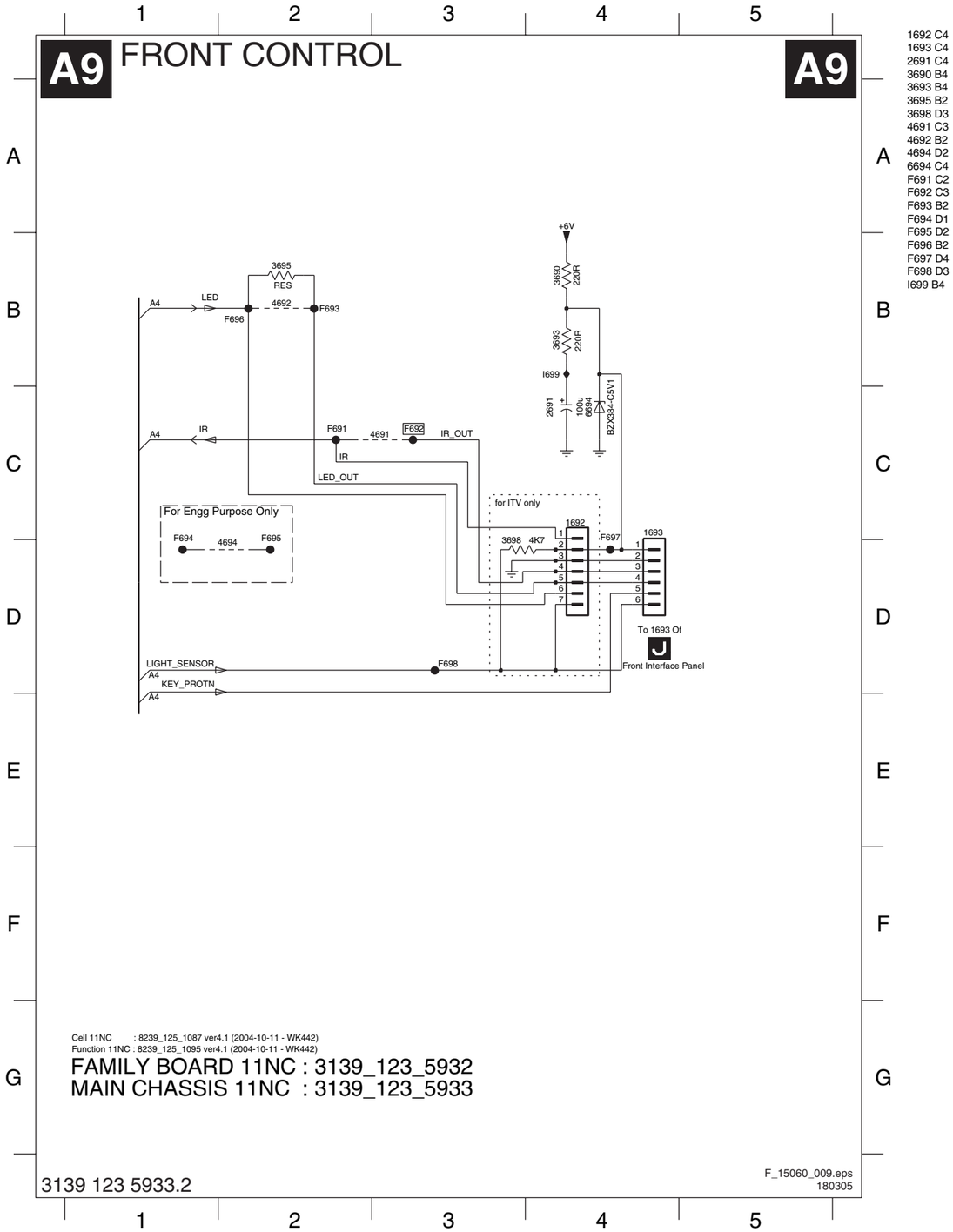
9170 9171 9172 9173 CGND CGND MainSupplyGnd

3139 123 5933.2

F_15060_008.eps 180305

1101 A3 F106 D3
1102 B3 F107 E3
1103 C3 F108 F3
1104 C3 F109 F3
1105 D3 F110 D9
1106 D3 F111 E9
1107 F3 F112 C9
1108 F3 F113 D9
1109 G3 F115 C7
1110 D9 F116 C6
1111 D9 F117 B6
1112 E9 F122 D3
1113 C9 F123 F3
1137 C10 F138 G7
1138 B4 F139 C9
1153 E2 F140 F1
1154 E2 I104 C6
1155 E2 I105 D6
1223-1 B2 I106 D6
1223-2 C2 I107 C5
1223-3 F2 I108 B5
1227 B7 I109 F6
1228 E1 I110 C2
1229 C8 I111 F5
1236 A5 I112 F5
1262 F8 I113 D8
2103 B5 I114 E8
2104 C5 I116 D7
2105 B5 I117 A5
2106 C5 I119 D10
2107 B4 I120 E7
2108 C4 I122 B4
2122 F4 I123 F6
2123 F6 I124 B4
2124 G4 I125 B5
2125 F6
2126 F4
2127 G4
2131 D8
2132 D7
2133 E8
2134 E7
2136 E9
2137 E9
2138 C2
3101 A3
3103 B4
3104 B5
3105 C4
3106 C5
3112 C5
3114 D5
3116 D5
3121 F4
3123 F4
3124 F5
3125 F4
3126 G5
3129 D10
3130 D9
3131 D8
3132 D8
3133 E8
3134 E8
3135 C8
3167 D4
3168 D4
3169 C4
3170 C2
3171 D2
3172 D1
3173 B4
3174 B4
4104 E8
4105 F3
4113 E7
4116 C10
4130 D9
4145 F2
6106 F3
6132 D8
7104-1 A5
7104-2 A4
7105 C2
9112 C5
9114 D5
9116 D5
9170 G1
9171 G1
9172 G1
9173 H1
F101 A3
F102 B3
F103 C3
F104 C3
F105 D3

Mono Carrier: Front Control



1692 C4
1693 C4
2691 C4
3690 B4
3693 B4
3695 B2
3698 D3
4691 C3
4692 B2
4694 D2
6694 C4
F691 C2
F692 C3
F693 B2
F694 D1
F695 D2
F696 B2
F697 D4
F698 D3
I699 B4

Mono Carrier: Diversity Tables A2 & A4

DIVERSITY TABLE FOR A2 LINE + FRAME DEFLECTION

Item No	27RF HD	30WSRF-HD	30WS ATSC	27RF ATSC	32RF ATSC	26WS ATSC
2407	---	---	50V 330P	50V 330P	50V 330P	50V 330P
2411	2KV 820P	2KV 220P	2KV 220P	2KV 820P	2KV 330P	2KV 1N
2412	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N
2413	630V 27N	630V 27N	630V 33N	630V 27N	630V 27N	630V 27N
2416	---	---	---	---	---	---
2417	---	---	---	---	---	---
2418	250V 390N	250V 330N	250V 330N	250V 390N	250V 330N	250V 330N
2419	250V 560N	250V 1U2	250V 1U2	250V 560N	250V 560N	250V 560N
2421	---	2KV 220P	2KV 220P	---	---	---
2422	---	2KV 220P	2KV 220P	---	---	---
2433	---	---	---	---	---	---
2435	---	---	---	---	---	---
2451	100V 220N	100V 100N	250V 68N	250V 68N	250V 68N	250V 68N
2458	250V 100N	250V 100N	---	---	---	---
2470	100V 100N	250V 47N	100V 100N	100V 100N	100V 100N	100V 100N
2471	16V 100N	16V 100N	---	---	---	---
2473	50V 15N	50V 15N	---	---	---	---
2474	50V 150P	50V 150P	---	---	---	---
2495	50V 100N	50V 100N	---	---	---	---
2499	---	---	16V 2U2	16V 2U2	16V 2U2	16V 2U2
3412	---	---	---	---	---	---
3413	1K	1K	1K	1K	1K	1K
3414	4R7	4R7	4R7	4R7	6R8	4R7
3415	4R7	4R7	4R7	4R7	6R8	4R7
3418	100R	100R	---	---	---	---
3419	4R7	4R7	4R7	4R7	6R8	4R7
3421	22R	22R	4R7	4R7	4R7	4R7
3424	---	1mA612V	1mA612V	---	---	---
3425	---	1mA612V	1mA612V	---	---	---
3426	100K	100K	---	---	---	---
3427	680K	680K	---	---	---	---
3428	22K	22K	---	---	---	---
3432	---	---	---	---	---	---
3433	4R7	4R7	4R7	4R7	10R	4R7
3434	5K6	3K9	---	---	---	---
3435	---	---	---	---	---	---
3436	680K	680K	---	---	---	---
3437	22K	22K	---	---	---	---
3440	2R2	2R2	2R2	2R2	2R2	2R2
3442	---	---	---	---	---	---
3451	4R7	4R7	4R7	4R7	10R	4R7
3459	820K	470K	470K	820K	680K	820K
3461	1K5	1K5	27K	27K	27K	27K
3463	1K5	1K5	3K3	3K3	3K3	3K3
3467	220R	220R	100R	100R	100R	100R
3468	220R	220R	100R	100R	100R	100R
3471	1R	2R2	2R2	1R	2R2	2R2
3472	1R2	1R5	1R5	1R2	1R2	1R2
3478	100R	100R	33K	33K	33K	33K
3480	4M7	4M7	---	---	---	---
3485	0R47	0R47	0R47	0R47	1R	0R47
3488	220K	220K	---	---	---	---
3489	100R	100R	10K	10K	10K	10K
3491	12K	12K	8K2	10K	8K2	10K
3492	18K	18K	12K	22K	47K	22K
3496	---	---	100K	100K	100K	100K
3497	---	---	56K	56K	56K	56K
3499	1M	1M	470K	470K	470K	470K
4401	---	---	JMP	JMP	JMP	JMP
4418	---	---	JMP	JMP	JMP	JMP
4495	JMP	JMP	---	---	---	---
5401	3U9	3U9	3U9	3U9	5U5	5U5
5408	W7132-004	W7131-001	W7131-001	W7132-004	W7132-004	W7132-004
5450	JF0101-85039	JF0101-85038	JF0101-85038	JF0101-85039	JF0101-85040	JF0101-85039
5456	---	SD20417-07	SD20417-07	---	---	---
6442	---	---	BZV85-C10	BZV85-C10	BZV85-C10	BZV85-C10
6449	BZX384-C15	BZX384-C15	BZX384-C12	BZX384-C12	BZX384-C12	BZX384-C12
6476	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8
6482	BZX384-C6V8	BZX384-C6V8	---	---	---	---
6483	BAS316	BAS316	---	---	---	---
6491	---	---	BZX384-C3V3	BZX384-C3V3	BZX384-C3V3	BZX384-C3V3
9402	---	---	---	---	---	---
9411	JMP	---	---	JMP	JMP	JMP
9432	---	---	JMP	JMP	JMP	JMP
9435	JMP	JMP	JMP	JMP	JMP	JMP
9440	---	---	---	---	---	---
9442	JMP	JMP	---	---	---	---
9476	---	---	---	---	---	---
9489	---	---	---	---	---	---
9490	---	---	---	---	---	---

DIVERSITY TABLE FOR A4 HERCULES

	HD set	ATSC set
2251	150n	10n
2293	1n	470p
2294	5n6	
2295	1n	
3238		10K
3246		100R
3252		10K
3262		100R
3265		100R
3266		100R
3279		4K7
3280		4K7
3282	4K7	
3291		4K7
4201		0R
4299		0R
5214	100MHz, 120R	

Region: NAFTA	HD		L05 ATSC	
Size	27V RF	30WSRF	27V RF	27V RF
2251	50V 150N	50V 150N	50V 10N	50V 10N
2293	25V 1N	25V 1N	50V 470N	50V 470N

Region	NAFTA			
Size	26WSRF-ATSC	30WSRF-ATSC	27VRF-ATSC	32VRF-ATSC
3246	100R	100R	100R	100R
3255	---	---	---	---
3256	---	---	---	---
9601	---	---	---	---
9602	---	---	---	---

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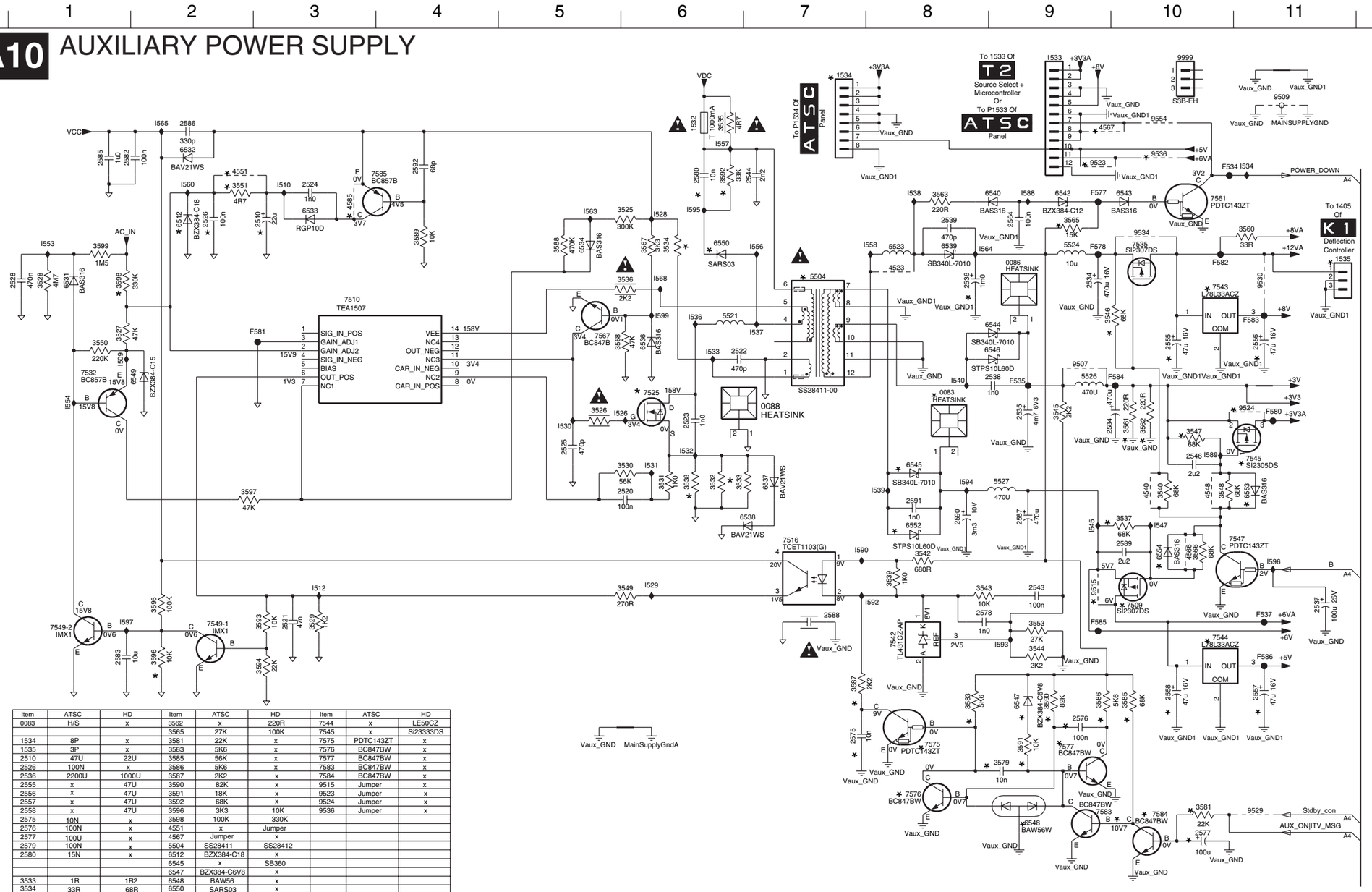
Mono Carrier: AUX Power Supply

A10 AUXILIARY POWER SUPPLY



Item	ATSC	HD	Item	ATSC	HD	Item	ATSC	HD
0083	H/S	x	3562	x	220R	7544	x	LE50CZ
			3565	27K	100K	7545	x	Si23333DS
1534	8P	x	3581	22K	x	7575	PDTC143ZT	x
1535	3P	x	3583	5K6	x	7576	BC847BW	x
2510	47U	22U	3585	56K	x	7577	BC847BW	x
2526	100N	x	3586	5K6	x	7583	BC847BW	x
2536	2200U	1000U	3587	2K2	x	7584	BC847BW	x
2555	x	47U	3590	82K	x	9515	Jumper	x
2556	x	47U	3591	18K	x	9523	Jumper	x
2557	x	47U	3592	68K	x	9524	Jumper	x
2558	x	47U	3596	3K3	10K	9536	Jumper	x
2575	10N	x	3598	100K	330K			
2576	100N	x	4551	x	Jumper			
2577	100U	x	4567	Jumper	x			
2579	100N	x	5504	SS28411	SS28412			
2580	15N	x	6512	BZX384-C18	x			
			6545	x	SB360			
			6547	BZX384-C6V8	x			
3533	1R	1R2	6548	BAW56	x			
3534	33R	68R	6550	SARS03	x			
3537	x	68K	6552	STPS10L25D	x			
3538	1R	x	6553	x	BAS316			
3546	68K	100K	6554	x	BAS316			
3547	x		7509	x	Si2307DS			
3551	4R7	x	7525	STP6NK60ZFP	STP5NK80ZFP			
3553	39K	27K	7542	TL431ACZ	TL431ACZ			
3561	x	220R	7543	x	L78L08ACZ			

x Layout Jumper

CELL 11NC : 8239_125_1089 ver6.0 (2004-12-03 - WK449.5)
FUNCTION 11NC : 8239_125_1097 ver6.0 (2004-12-03 - WK449.5)

FAMILY BOARD 11NC : 3139_123_5932
MAIN CHASSIS 11NC : 3139_123_5933

F_15060_010.eps
180305

3139 123 5933.2

0083 C8	3598 C1	I545 E9
0086 B9	3599 B1	I547 E10
0088 D7	4523 B8	I553 B1
1532 A6	4540 D10	I554 D1
1533 A9	4548 D10	I556 B7
1534 A7	4551 B2	I557 A6
1535 B11	4566 E10	I558 B8
2510 B3	4567 A9	I560 B2
2520 D6	4585 B3	I563 B5
2521 E3	5504 B7	I564 B8
2522 C6	5521 C6	I565 A2
2523 D6	5523 B8	I568 B6
2524 B3	5524 B9	I588 B9
2525 D5	5526 C9	I589 D10
2526 B2	5527 D9	I590 E7
2528 C1	6512 B2	I592 E8
2534 C9	6531 C1	I593 E9
2535 D9	6532 A2	I594 D8
2536 C8	6533 B3	I595 B6
2537 E11	6534 B5	I596 E11
2538 C9	6536 C6	I597 E1
2539 B8	6537 D7	I599 C6
2543 E9	6538 D7	
2544 B7	6539 B8	
2546 D10	6540 B9	
2555 C10	6542 B9	
2556 C11	6543 B10	
2557 F11	6544 C9	
2558 F10	6545 D8	
2564 B9	6546 C9	
2575 F7	6547 F9	
2576 F9	6548 G9	
2577 G10	6549 C2	
2578 E8	6550 B6	
2579 F9	6552 E8	
2580 B6	6553 D11	
2582 B1	6554 E10	
2583 F1	7509 E10	
2584 D10	7510 C3	
2585 B1	7516 E7	
2586 A2	7525 C6	
2587 D9	7532 C1	
2588 E7	7535 B10	
2589 E10	7542 E8	
2590 D8	7543 C10	
2591 D8	7544 E10	
2592 B4	7545 D11	
3525 B6	7547 E10	
3526 D5	7549-1 E2	
3527 C1	7549-2 E1	
3528 C1	7561 B10	
3529 E3	7567 C5	
3530 D6	7575 F8	
3531 D6	7576 G8	
3532 D6	7577 F9	
3533 D6	7583 G10	
3534 B6	7584 G10	
3535 A6	7585 B3	
3536 C6	9507 C9	
3537 D10	9509 A11	
3538 D6	9515 E9	
3539 E8	9523 B9	
3540 D10	9524 D11	
3542 E8	9529 G11	
3543 E8	9530 C11	
3544 F9	9534 B10	
3545 D9	9536 A10	
3546 C9	9554 A10	
3547 D10	9999 A10	
3548 D10	F534 B10	
3549 E6	F535 C9	
3550 C1	F537 E11	
3551 B2	F577 B9	
3553 E9	F578 B9	
3560 B11	F580 D11	
3561 D10	F581 C3	
3562 D10	F582 B10	
3563 B8	F583 C11	
3565 B9	F584 C10	
3566 E10	F585 E9	
3567 B6	F586 F11	
3568 C5	I509 C1	
3581 G10	I510 B3	
3583 F8	I512 E3	
3585 F10	I526 D5	
3586 F9	I528 B6	
3587 F7	I529 E6	
3588 B5	I530 D5	
3589 B4	I531 D6	
3590 F9	I532 D6	
3591 F9	I533 C6	
3592 B6	I534 B11	
3593 E3	I536 C6	
3594 F3	I537 C7	
3595 E2	I538 B8	
3596 F2	I539 D8	
3597 D2	I540 C8	

Layout Mono Carrier: (Top Side)

0083	C2	1013	E8	1222	D3	1250	C7	1273	E5	1503	C2	1572	C4	2105	D7	2234	D6	2413	B6	2449	C8	2502	C2	2523	B3	2555	C1	2587	C2	3105	E8	3241	E5	3401	B5	3432	C7	3467	C7	3488	C6	3506	B1	3521	A5	3592	B3	5409	B6	5512	B4	5563	C5	6457	C8	9248	E6	9547	D2
0086	C3	1137	C8	1223	D8	1251	C6	1280	E3	1504	C2	1577	D3	2106	D7	2240	E5	2416	B6	2451	A8	2503	A3	2528	B3	2556	D2	2588	C3	3112	D8	3252	D5	3402	B5	3433	B8	3468	C7	3489	C6	3508	B3	3523	C2	3598	B3	5450	B7	5512C	B4	5564	A3	6461	B8	9249	C4	9548	D2
0088	B3	1138	D7	1227	D7	1252	D6	1281	E3	1505	A1	1682	D4	2123	D7	2250	D6	2417	B6	2454	A8	2504	A4	2534	C4	2557	C1	2590	C2	3114	D8	3260	D5	3412	A6	3435	C5	3469	C7	3490	A5	3509	B2	3525	C4	3599	B3	5452	C6	5512D	B4	5602	D7	6466	B7	9250	E6	9549	D2
1000	E8	1205	D5	1228	D7	1254	C6	1282	D3	1507	B2	1683	C5	2125	D8	2251	E5	2418	A6	2458	B7	2505	A4	2535	D3	2558	C1	2611	E4	3116	D8	3270	E7	3413	A6	3440	C6	3471	C7	3493	B8	3510	B3	3531	B3	3606	E4	5456	A6	5521	B3	6001	E8	6467	B7	9251	E5	9550	C1
1001	E6	1206	D5	1229	C8	1255	C6	1401	C6	1510	B1	1684	D6	2132	C7	2265	E6	2419	B6	2460	A8	2506	B2	2536	D3	2561	B4	2621	E5	3123	D8	3274	E7	3414	A6	3442	C7	3472	C7	3499	C6	3511	B5	3534	C3	3984	D3	5459	B6	5524	D3	6006	E7	6471	C6	9252	C5	9551	C3
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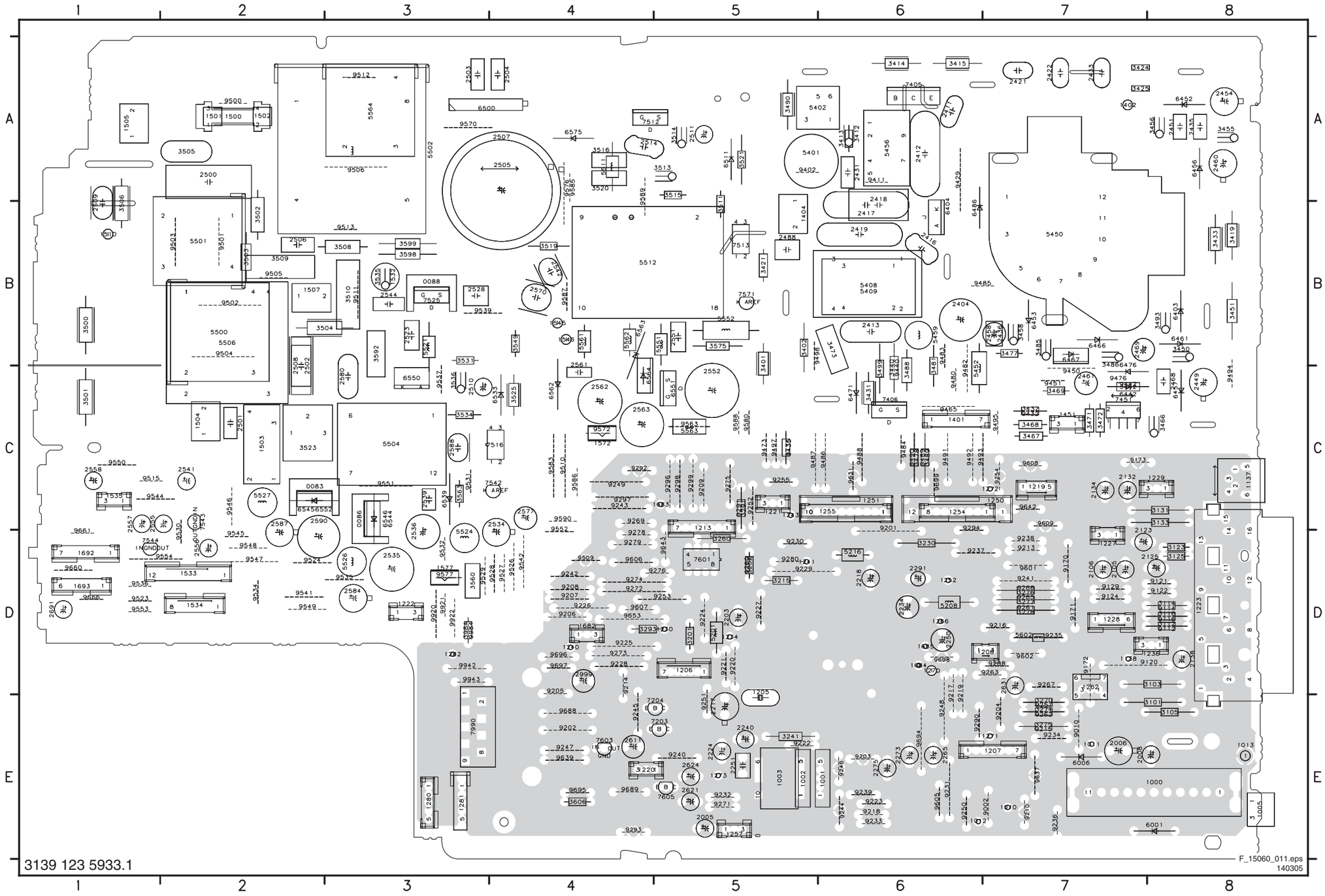

Layout Mono Carrier (Overview Bottom Side)

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3548 B2 3550 D4 3551 D4 3553 C4 3561 B2 3562 B3 3565 C3 3566 B2 3567 C4 3568 D3 3571 D5 3573 D5
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6537 D3 6538 D3 6540 C3
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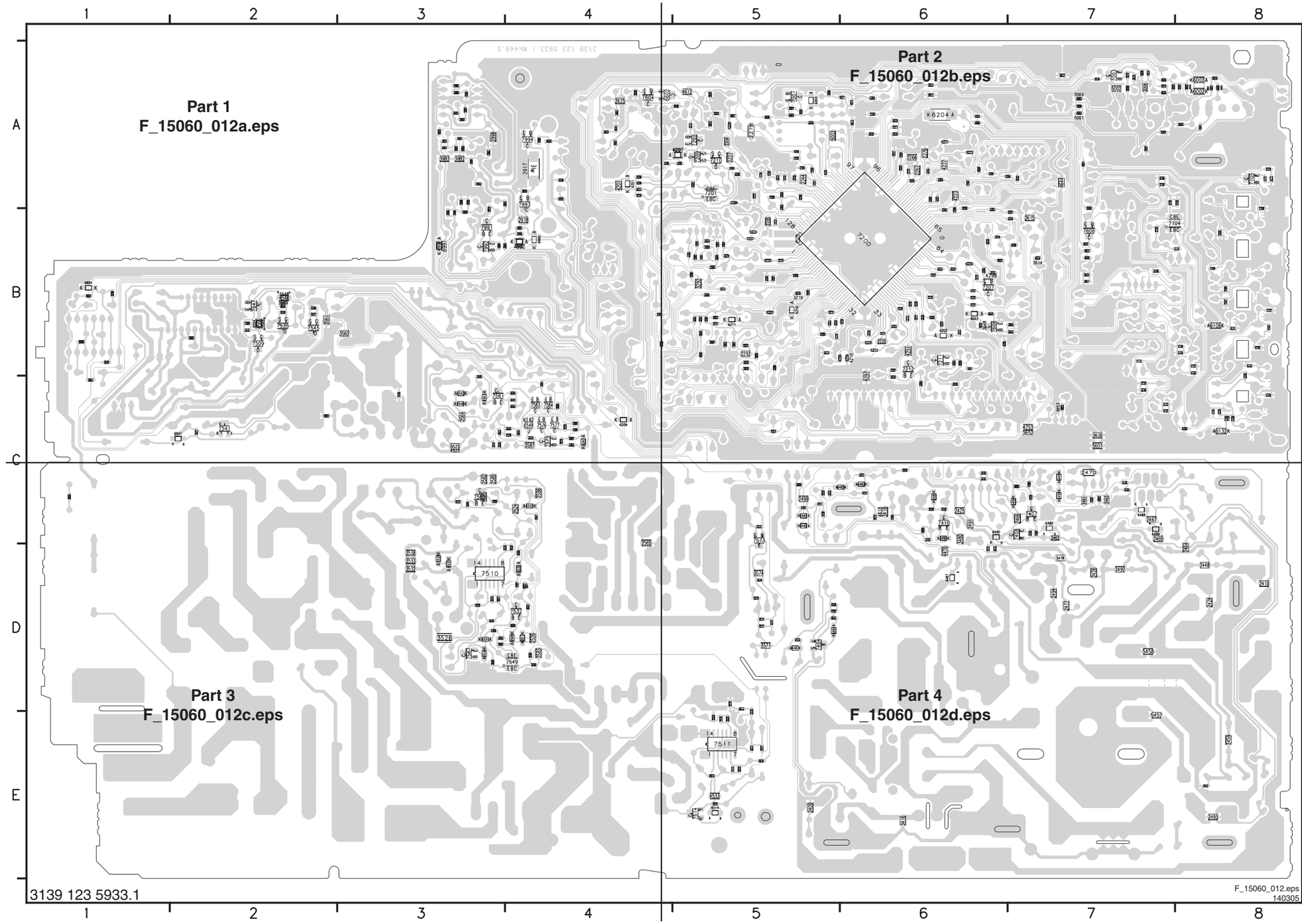
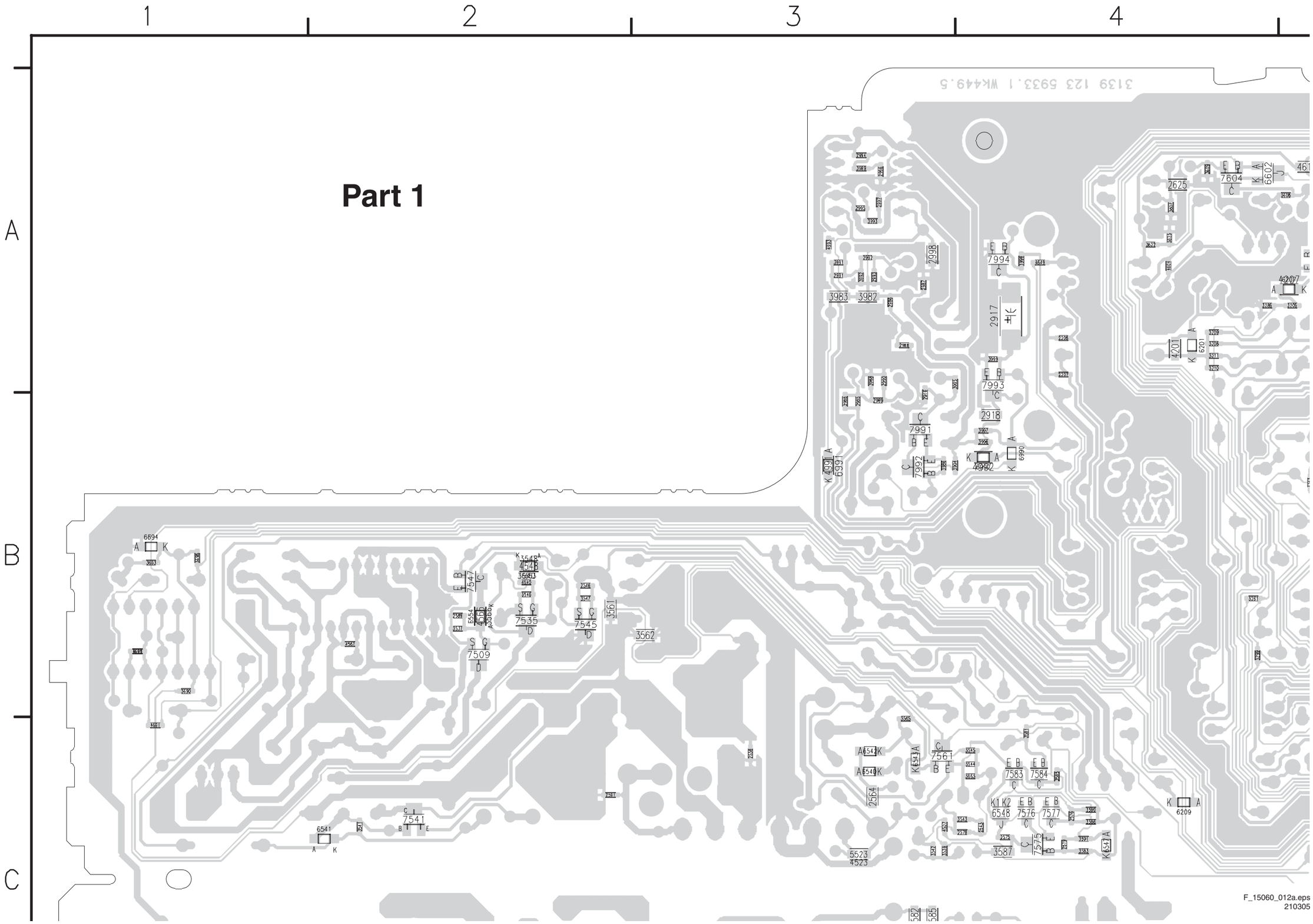
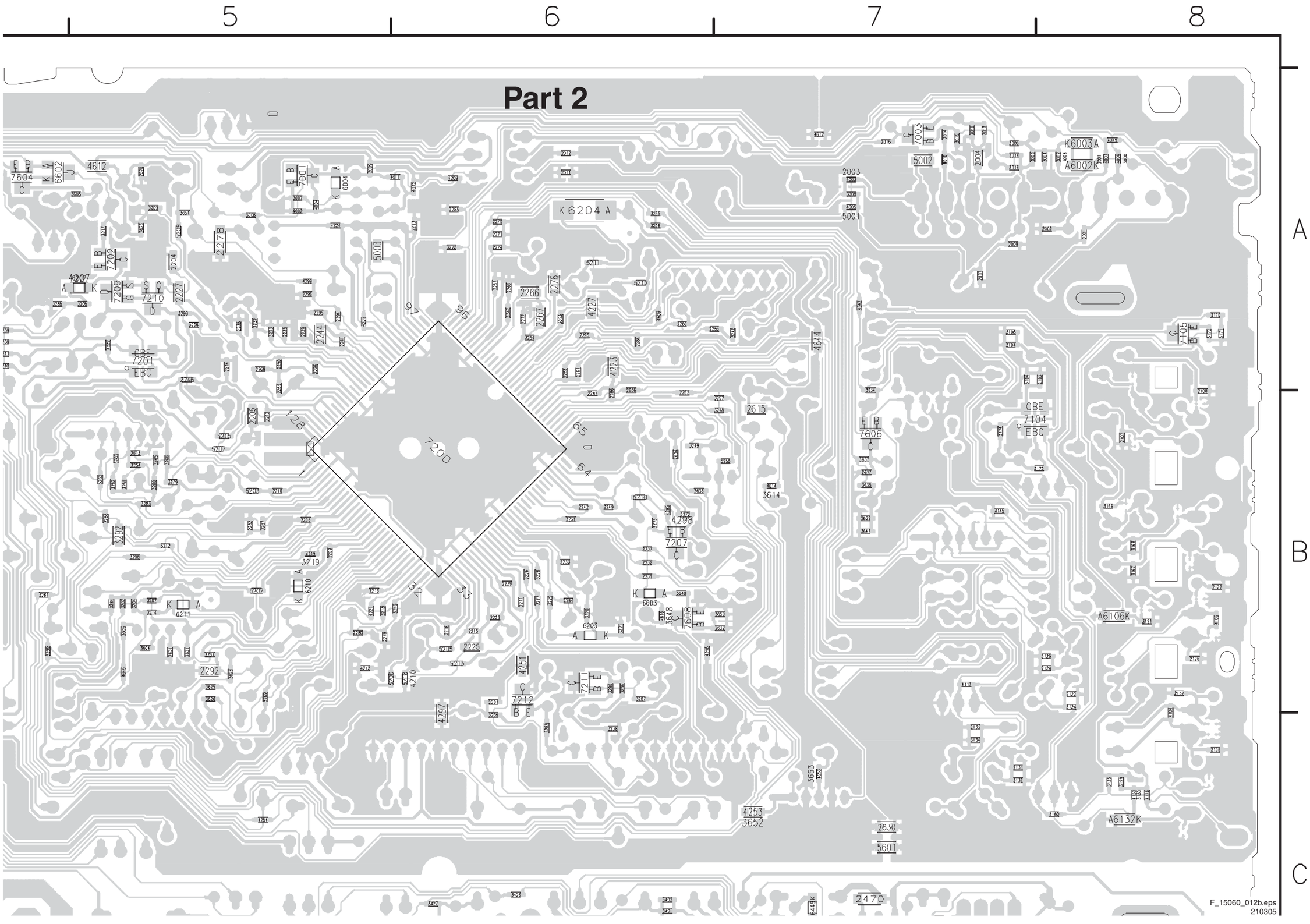


Layout Mono Carrier (Part 1 Bottom Side)

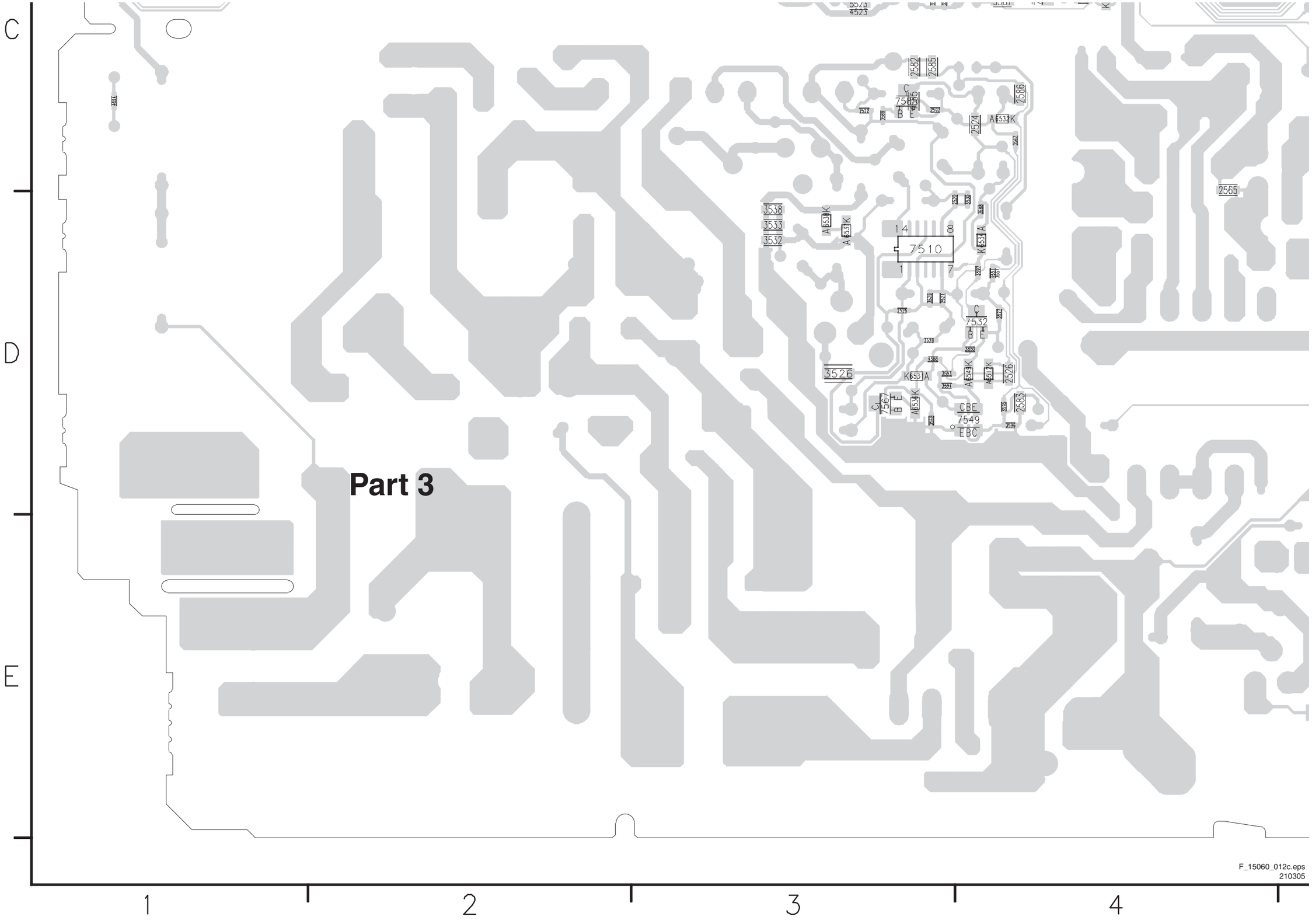
Part 1



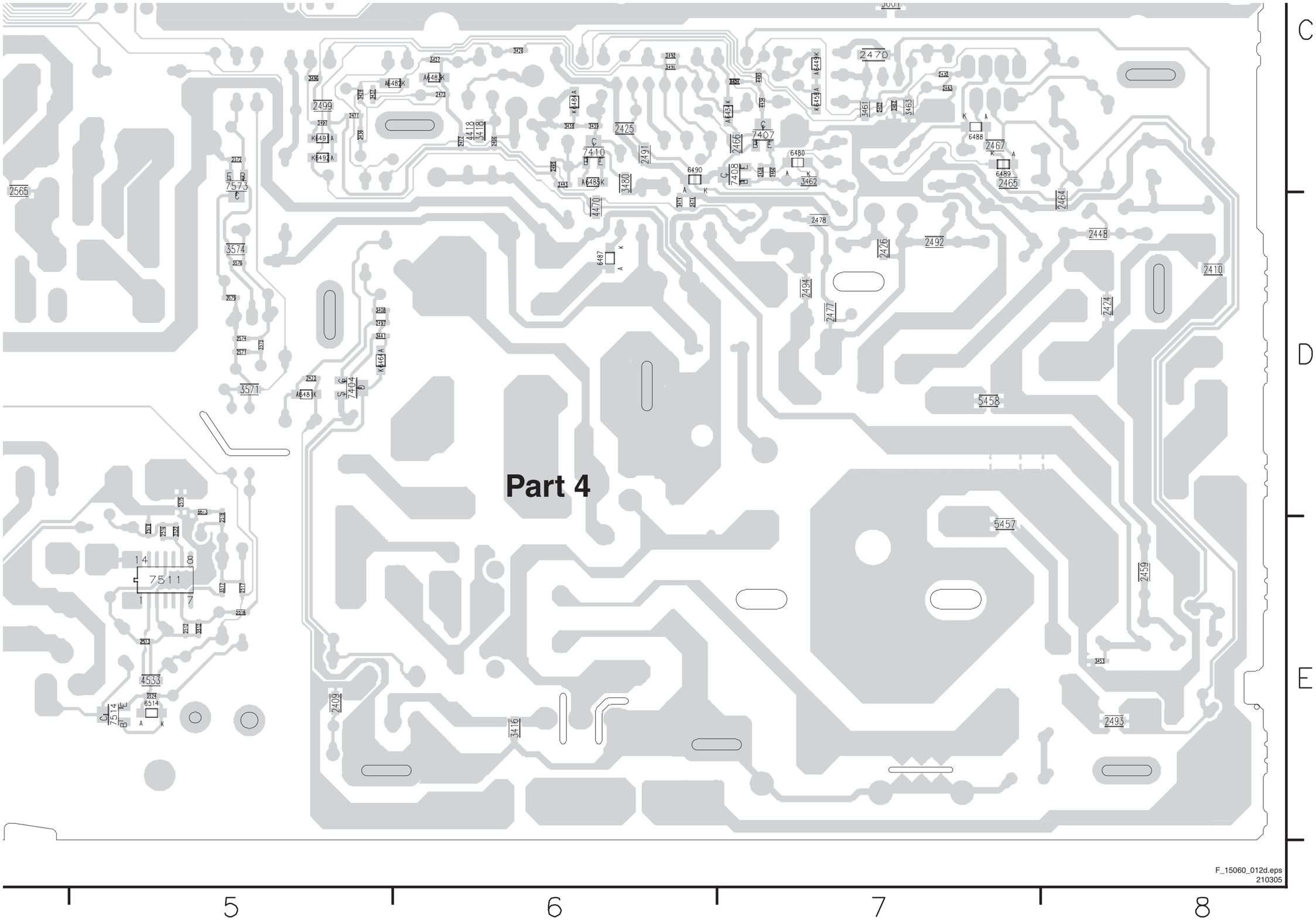
Layout Mono Carrier (Part 2 Bottom Side)



Layout Mono Carrier (Part 3 Bottom Side)



Layout Mono Carrier (Part 4 Bottom Side)



CRT Panel (Multi Board)

B1 CRT SOCKET

B1

AQUADAG WIRE

F345 1335

CRT SOCKET 1354

+200A 6331 BAV21WS

6332 BAV21WS 6333 BAV21WS

9308 3308 1K0 GND_RGB

G B2 I330 3333 100R I333 3334 1K0 F338

R B2 I331 3335 100R I334 3336 1K0 F339

B B2 I332 3331 100R I335 3332 1K0 F341

GND_LS1

Blue

Green

Red

TO CRT SOCKET

CRT

VG1 VG2 STATIC FOCUS DYN FOCUS

TO CRT SOCKET

EHT

3307 3R3

9306 3306 3R3 I350

I348 3345 33R +200A

5304 9328 I373

1351 F352 I327

From 1401 of A2 Line + Frame Deflection

DC_Filament F383

+141V

EHT-INFO 200V F340

+8V_+12V F354 3351 150R I351 I323

F331 GND_LS1

SVM_ROT A2,B3

2313 470u I322 GND_RGB

3390 221 10n 2319 10n 3391 3357 GND_RGB

GND_LS1 GND_LS1 GND_LS1

GND_RGB

9310

FOCUS

FROM LOT, MAIN CHASSIS A2 LINE + FRAME DEFLECTION

1336 VG2

I377 3347 1K5 F347

2324 820p 2317 4n7 RES

F342 GND_LS1

Item No.	HD	ATSC
3390	---	30PW
6325	BZX79-2V7	BZX79-3V3

+12A1 9309 +12A

5308 5u6 I336

2347 470u GND_RGB

F397 3305 1R0 +8V_+12V

I379

5303 5u6 +12V_SVM

I302 3325 1K8 I308 +3V

6325 BZX79-C3V3 GND_RGB

F398 3999 1K2 F399

5324 9324

GND_LS1 2320 10n 10n 2357 GND_LS1 GND_RGB

MULTIPLE BOARD 11NC : 3139_123_5945
SINGLE BOARD 11NC : 3139_123_5946

3139 123 5946.1

F_15060_032.eps 180305

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1336 F11
1351 D1
1354 B6
2313 E3
2317 F7
2319 E5
2320 G5
2321 E4
2324 F7
2347 G2
2357 H5
3305 G1
3306 D4
3307 D4
3308 B4
3325 H1
3331 C2
3332 C3
3333 B2
3334 B3
3335 C2
3336 C3
3345 E4
3347 E7
3351 E3
3357 E5
3390 E4
3391 E5
3999 G5
5303 G2
5304 D5
5308 F2
5324 G5
6325 H2
6331 A3
6332 B2
6333 B3
9306 D4
9308 B4
9309 F3
9310 E5
9324 G5
9328 D5
F331 E2
F338 B4
F339 C4
F340 D3
F341 C4
F342 F7
F345 A7
F347 E7
F352 D2
F354 E3
F383 D3
F397 G1
F398 G5
F399 G5
I302 H1
I308 H2
I322 E3
I323 E3
I327 D2
I330 B2
I331 C2
I332 C2
I333 B3
I334 C3
I335 C3
I336 G3
I348 E4
I350 D4
I351 E3
I373 D6
I377 E6
I379 G2

CRT Panel: RGB Amplifier (Multi Board)

B2 RGB AMPLIFIER

B2

From 1202 of T5 Deflection Controller of Trident Panel Or To 1404 Of K1 Deflection Controller - ATSC

1340: 1 R-CRT, 2 G-CRT, 3 B-CRT, 4 F336, 5 CUT OFF

Item No.	HD	ATSC
2335	10P	12P
2337	10P	12P
2341	10P	12P
2369	330P	-
3338	2K2	2K7
3339	2K7	3K3
3342	2K7	3K3
3343	2K2	2K7
3353	2K2	2K7
3354	2K7	3K3

MULTIPLE BOARD 11NC : 3139_123_5945
SINGLE BOARD 11NC : 3139_123_5946

3139 123 5946.1

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0069 A9
0077 F7
0078 C9
1340 C1
2330 A4
2331 C4
2332 B5
2333 B9
2334 E2
2335 A5
2336 C8
2337 C5
2338 A9
2339 C9
2340 F9
2341 F3
2343 D9
2344 E5
2346 E8
2352 G3
2353 F8
2355 A3
2356 H5
2358 D3
2360 D2
2369 B9
3317 B9
3320 B4
3321 A3
3322 A3
3323 D4
3324 C3
3326 C3
3327 D2
3328 E2
3329 F2
3337 A6
3338 A5
3339 B5
3340 B4
3341 C6
3342 D5
3343 C5
3344 E4
3352 F4
3353 F3
3354 F3
3355 G3
4311 C8
4312 D9
4313 F8
4314 F8
4315 H5
6307 C9
6308 B9
7330 A5
7340 D5
7350 F3
7351 A4
7352 C4
7353 E2
9301 B9
9302 B3
9303 D3
9304 E1
F332 A2
F334 C2
F335 C2
F336 C2
F337 D2
F348 H5
I309 A4
I310 A3
I311 C4
I313 E2
I328 G3
I329 F3
I342 B9
I344 E2
I346 E9
I347 G9
I382 C3
I383 C3
I384 D2
I389 A5
I390 A6
I391 B9
I392 B5
I393 C7
I394 D9
I395 C5
I396 E5
I397 F4
I398 F7
I399 A3

CRT Panel: Rot. & SCAVEM (Multi Board)

B3 ROTATION & SCAVEM

B3

SCAVEM

ROTATION

Item No.	HD	ATSC
2364	470P	4n7
2365	470P	4n7
2383	220p	680P
2393	-	220p(30PW)
3366	120k	68k
3367	120k	68k
3371	560R	2K2
3373	1K5	4K7
3378	68R	330R
3380	33K	22K
3381	18K	33K
3384	330K	-
3385	4K7	-
3393	56R	-
9393	-	Jmp

0087 A8 I366 B7
1361 C11 I367 B6
1362 C11 I368 A8
1381 E11 I369 C7
2361 B6 I370 D4
2363 A6 I371 D7
2364 B6 I375 C5
2365 D6 I380 E7
2367 G6 I381 G6
2368 C6 I386 B4
2370 E7 I387 E6
2381 B5
2382 B3
2383 C9
2384 A7
2385 D7
2387 E4
2389 G7
2390 D9
2391 D3
2392 D2
2393 E2
3309 D3
3310 B7
3311 C7
3350 G5
3361 B4
3362 C5
3363 A7
3364 A7
3365 B7
3366 C7
3367 C7
3368 D7
3369 D8
3370 D7
3371 C8
3372 G8
3373 A4
3374 C10
3377 E4
3378 D3
3379 E2
3380 E6
3381 E6
3382 B4
3383 E2
3384 E6
3385 G5
3392 C8
3393 C5
3394 D7
3395 B2
3396 E5
3397 B5
3398 D2
3399 C9
4362 A2
4363 G2
5361 B8
5362 B2
6334 E5
6361 B3
6362 C4
6363 B2
7331 D2
7332 A7
7333 D8
7361 B5
7362 C4
7363 B8
7364 C8
7365 D4
7366 D8
9322 C2
9323 B8
9325 G3
9393 C5
F361 B8
F362 C8
F381 E10
F382 E10
I314 B8
I315 D8
I316 D8
I317 C9
I319 F8
I320 D7
I321 A4
I325 D3
I326 D2
I360 A7
I361 B4
I362 C5
I364 D6
I365 C7

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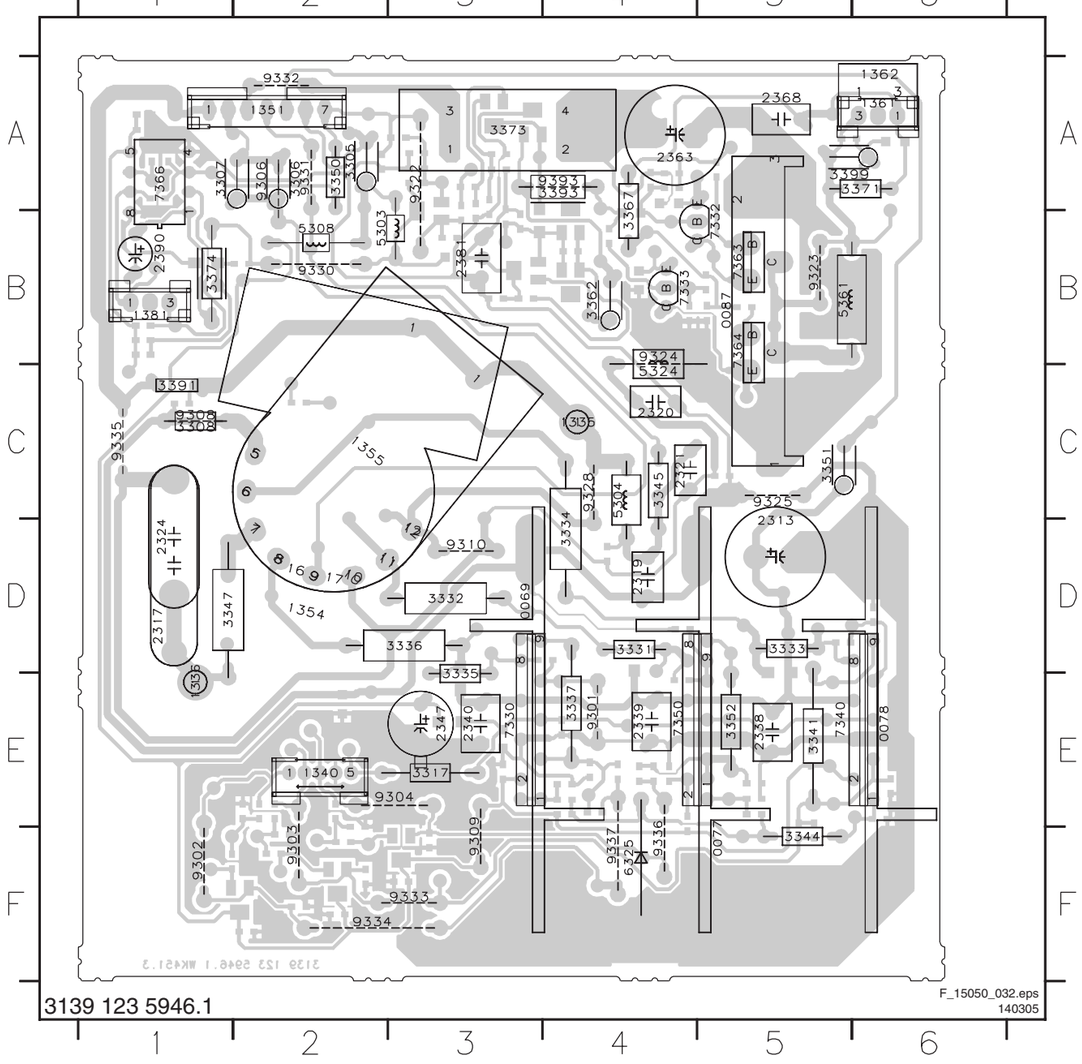
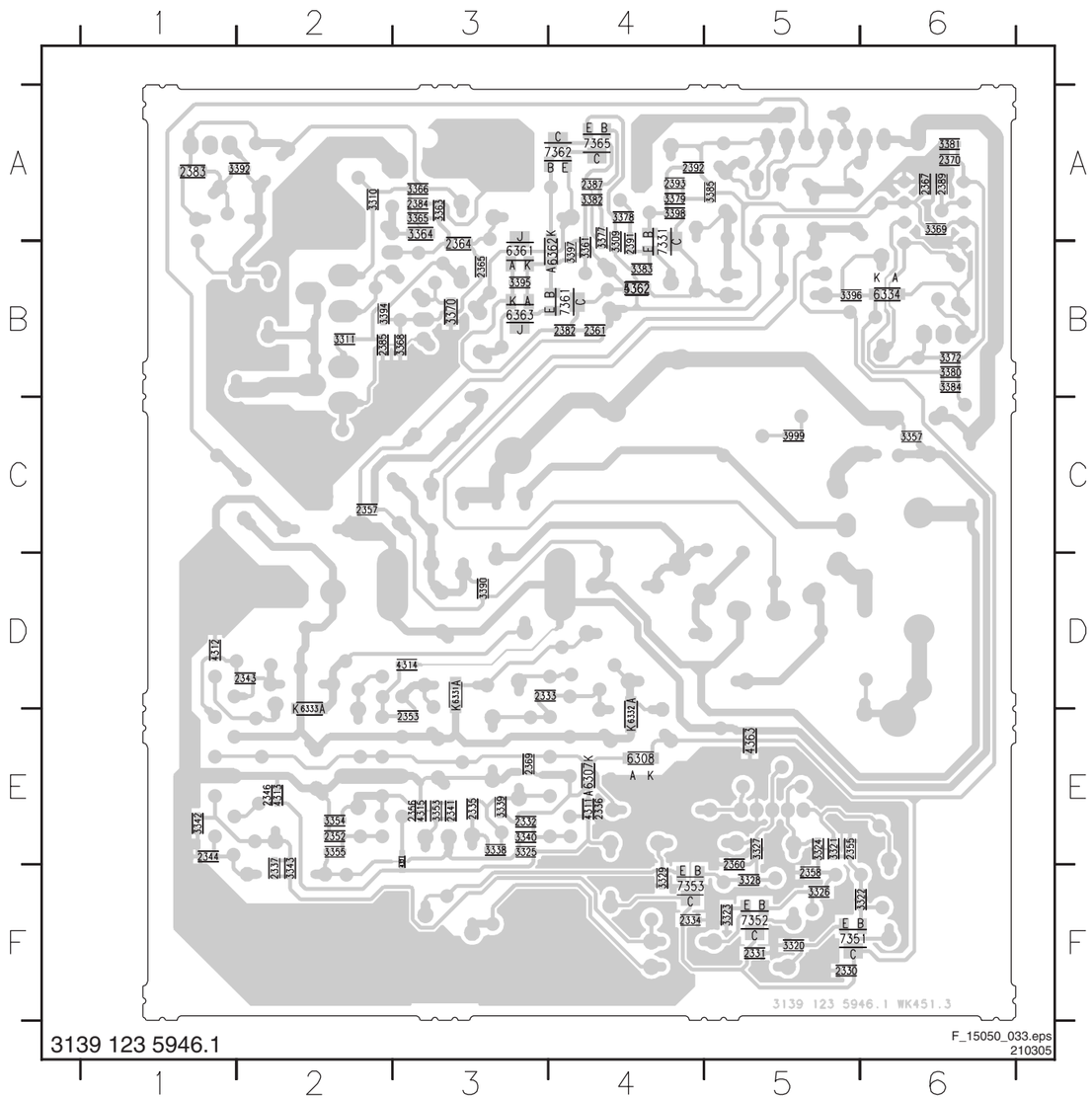
Layout CRT Panel (Top Side) (Multi Board)

0069 D3 0077 F5 0078 E6 0087 B5 1335 C4 1336 E1 1340 E2 1351 A2 1354 D2 1355 C2 1361 A6 1362 A6 1381 B1 2313 D5 2317 D1 2319 D4 2320 C4 2321 C4 2324 D1 2338 E5 2339 E4 2340 E3 2347 E3 2363 A4 2368 A5 2381 B3 2390 B1 3305 A2 3306 A2 3307 A1 3308 C1 3317 E3 3331 D4 3332 D3 3333 D5 3334 D4 3335 E3 3336 D3 3337 E4 3341 E5 3344 F5 3345 C4 3347 D1 3350 A2 3351 C5 3352 E5 3362 B4 3367 B4 3371 A6 3373 A3 3374 B1 3391 C1 3393 A4 3399 A5 5303 B2 5304 C4 5308 B2 5324 C4 5361 B5 6325 F4 7330 E3 7332 B5 7333 B4 7340 E5 7350 E4 7363 B5 7364 B5 7366 A1 9301 E4 9302 F1 9303 F2 9304 E3 9305 F3 9306 A2 9307 C2 9308 C1 9309 F3 9310 B4 9322 A4 9323 B5 9324 B4 9325 C5 9328 C4 9330 B2 9331 A2 9332 A2 9333 F3 9334 F2 9335 C1 9336 F4 9337 F4 9393 A4

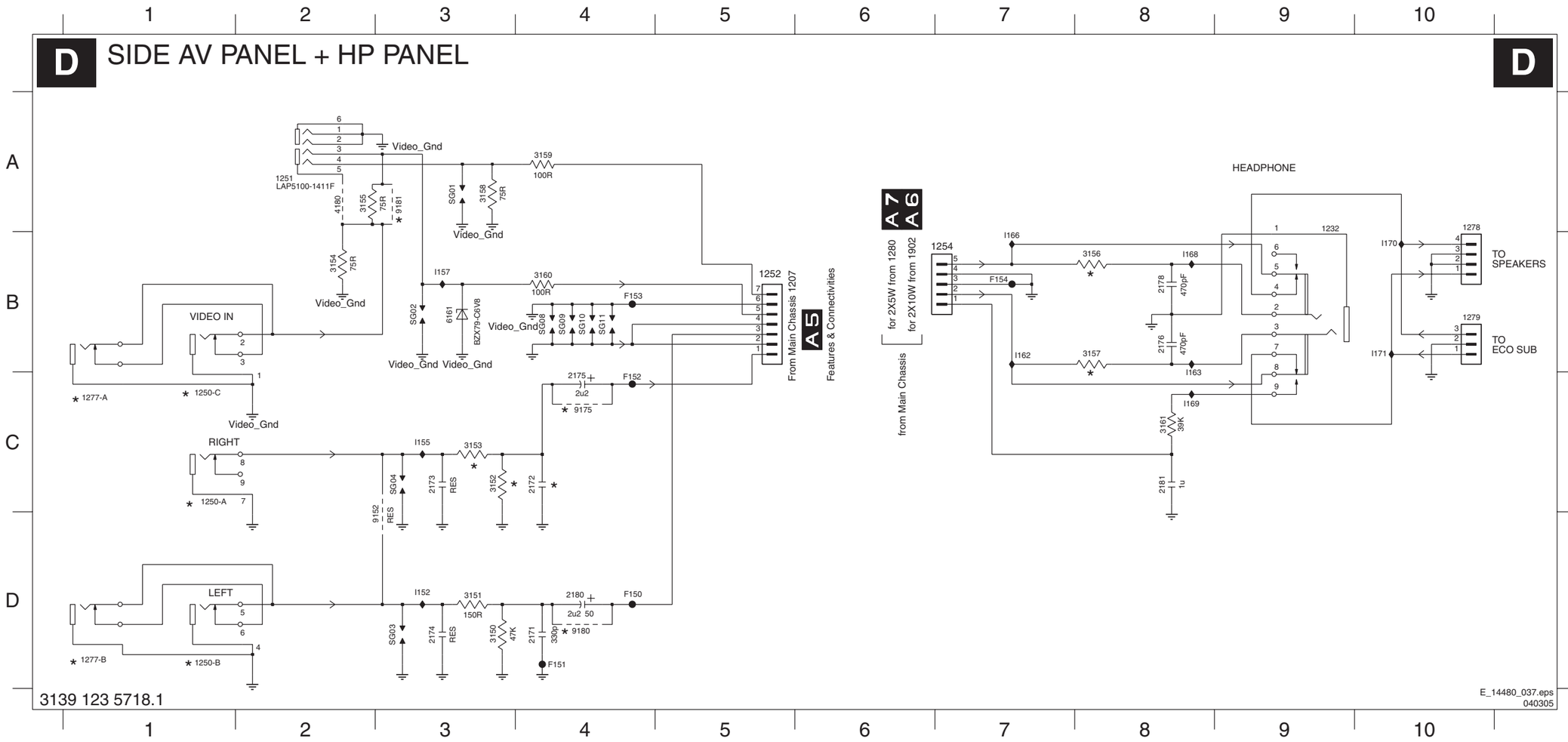


Layout CRT Panel (Bottom Side) (Multi Board)

2330 F5 2331 F5 2332 E3 2333 D3 2334 F4 2335 E3 2336 E4 2337 F2 2341 E3 2343 D2 2344 E1 2346 E2 2352 E2 2353 E3 2355 E5 2356 E3 2357 C2 2358 F5 2360 E5 2361 B4 2362 B4 2363 A6 2364 A6 2365 B3 2369 E3 2370 A6 2382 B4 2383 A6 2384 A6 2387 A4 2389 A6 2391 B4 2392 A4 2393 A4 2394 A4 2395 F4 2398 E3 3309 B4 3310 A2 3311 B2 3320 F5 3321 E5 3322 F6 3323 F5 3324 E5 3325 E3 3326 F5 3327 E5 3328 F5 3329 F4 3338 E3 3339 E3 3340 E3 3342 E1 3343 F2 3353 E3 3354 E2 3355 E2 3357 C6 3361 B4 3363 A3 3364 A3 3365 A3 3366 A3 3368 B3 3369 A6 3370 B3 3372 B6 3377 A4 3378 A4 3379 A4 3380 B6 3381 A6 3382 A4 3383 B4 3384 B6 3385 A5 3390 D3 3392 A2 3394 B2 3395 B3 3396 B5 3397 B4 3398 C5 3999 C5 4311 E4 4312 D1 4313 E2 4314 D3 4315 E3 4321 E3 4333 D2 4362 B4 4363 E5 5362 B4 6301 E4 6303 B3 6307 E4 6308 B6 6309 B6 6331 D3 6332 E4 6333 E4 6334 B4 6361 B4 6362 B4 6363 B3 7331 B4 7351 F5 7352 F5 7353 F5 7361 B4 7362 A4 7365 A4



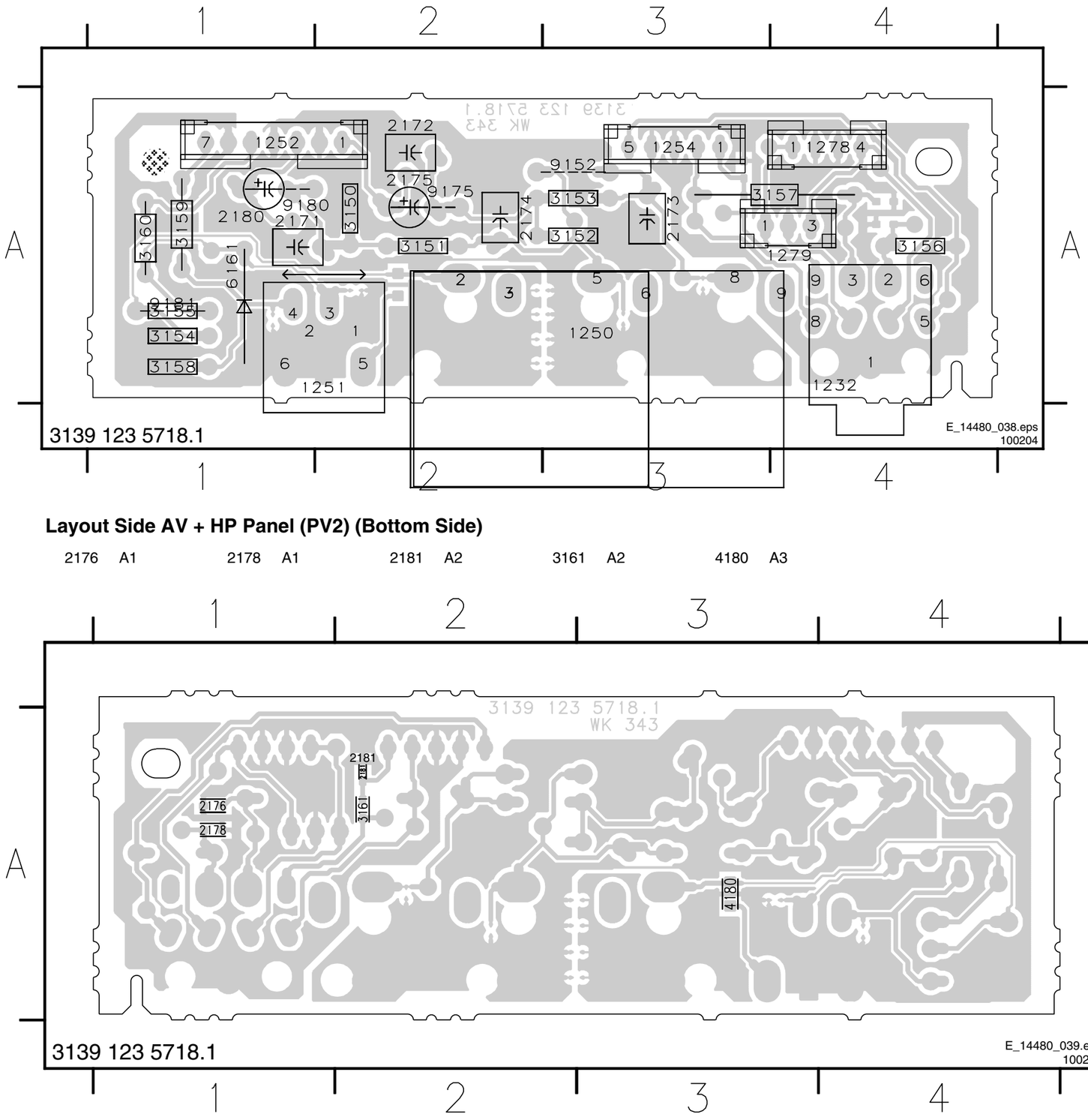
Side AV + HP Panel (PV2)



1232 A9
1250-A C1
1250-B D1
1250-C C1
1251 A2
1252 B5
1254 B6
1277-A C1
1277-B D1
1278 A10
1279 B10
2171 D4
2172 C4
2173 C3
2174 D3
2175 C4
2176 B8
2178 B8
2180 D4
2181 C8
3150 D3
3151 D3
3152 C3
3153 C3
3154 B2
3155 A2
3156 B8
3157 B8
3158 A3
3159 A4
3160 B4
3161 C8
4180 A2
6161 B3
9152 D3
9175 C4
9180 D4
9181 A3
F150 D4
F151 D4
F152 C4
F153 B4
F154 B7
I152 D3
I155 C3
I157 B3
I162 B7
I163 C8
I166 B7
I168 B8
I169 C8
I170 B10
I171 B10
SG01 A3
SG02 B3
SG03 D3
SG04 C3
SG08 B4
SG09 B4
SG10 B4
SG11 B4

Layout Side AV + HP Panel (PV2) (Top Side)

1232	A4	1254	A3	2171	A1	2175	A2	3152	A3	3156	A4	3160	A1	9180	A1
1250	A3	1277	A2	2172	A2	2180	A1	3153	A3	3157	A4	6161	A1	9181	A1
1251	A2	1278	A4	2173	A3	3150	A2	3154	A1	3158	A1	9152	A3		
1252	A1	1279	A4	2174	A2	3151	A2	3155	A1	3159	A1	9175	A2		

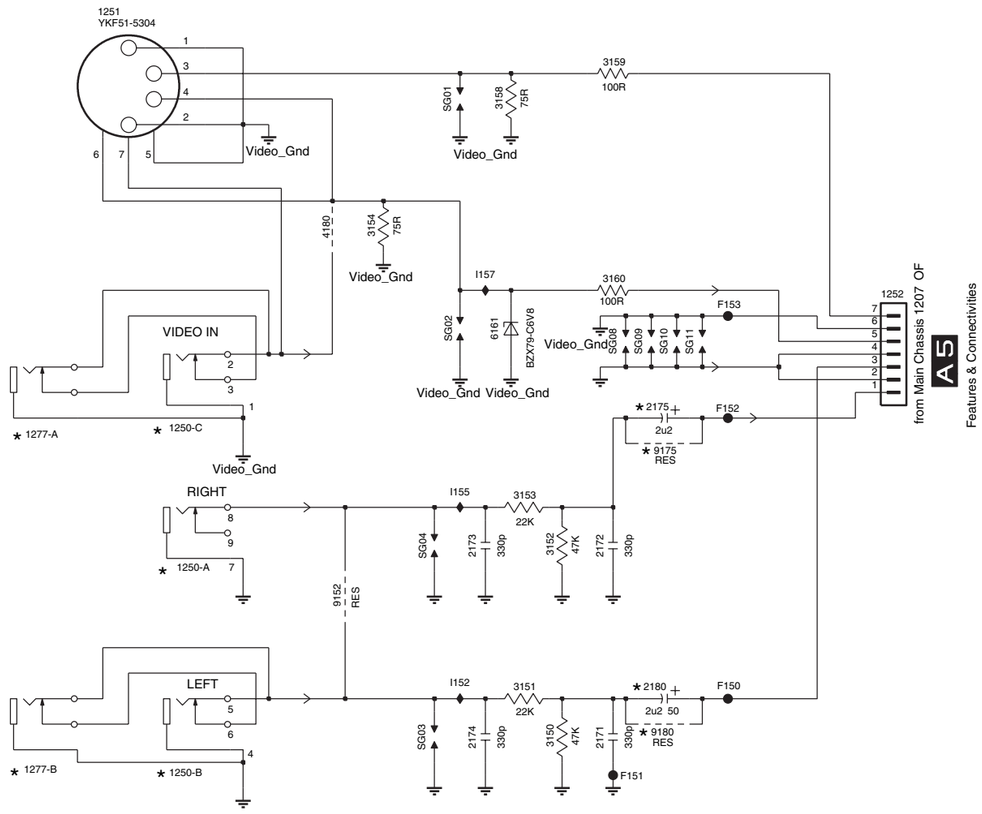


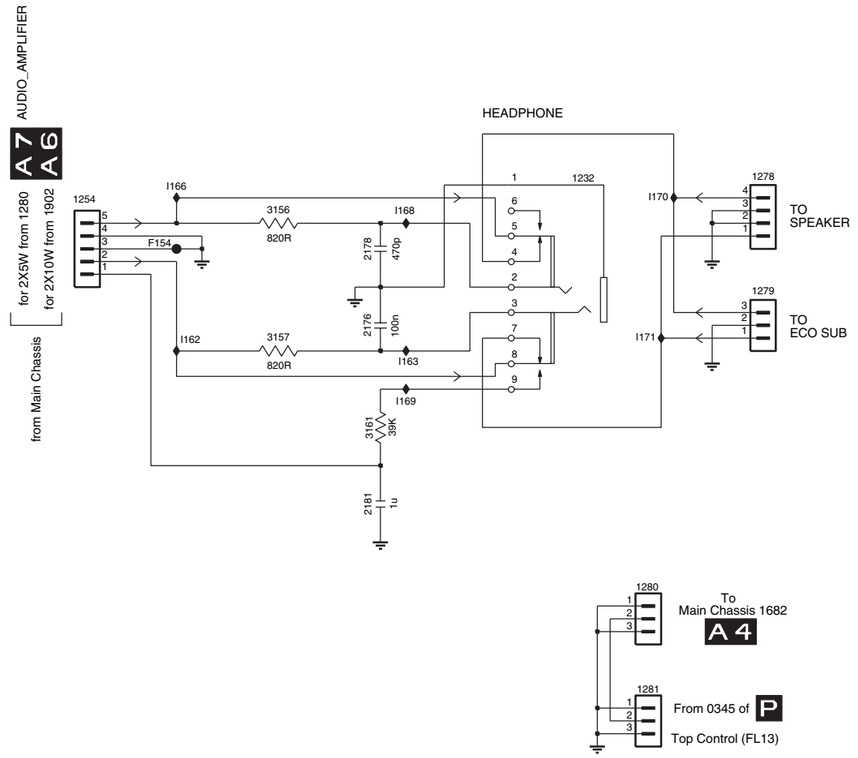
Layout Side AV + HP Panel (PV2) (Bottom Side)

2176	A1	2178	A1	2181	A2	3161	A2	4180	A3

Side AV + HP Panel (FL13)

SIDE AV PANEL + HP PANEL (FL13)





1232 B10
1250-A E2
1250-B F2
1250-C D2
1251 B1
1252 C6
1254 B7
1277-A D1
1277-B F1
1278 B11
1279 C11
1280 E10
1281 E10
2171 F4
2172 E4
2173 E3
2174 F3
2175 D4
2176 C9
2178 C9
2180 E4
2181 D9
3150 F4
3151 E4
3152 E4
3153 D4
3154 C3
3156 B8
3157 C8
3158 B4
3159 B4
3160 C4
3161 D9
4180 C3
6161 C3
9152 E3
9175 D4
9180 F4
F150 E5
F151 F4
F152 D5
F153 C5
F154 C7
I152 E3
I155 D3
I157 C3
I162 C8
I163 C9
I166 B7
I168 B9
I169 D9
I170 B10
I171 C10
SG01 B3
SG02 C3
SG03 F3
SG04 E3
SG08 C4
SG09 C4
SG10 C4
SG11 C5

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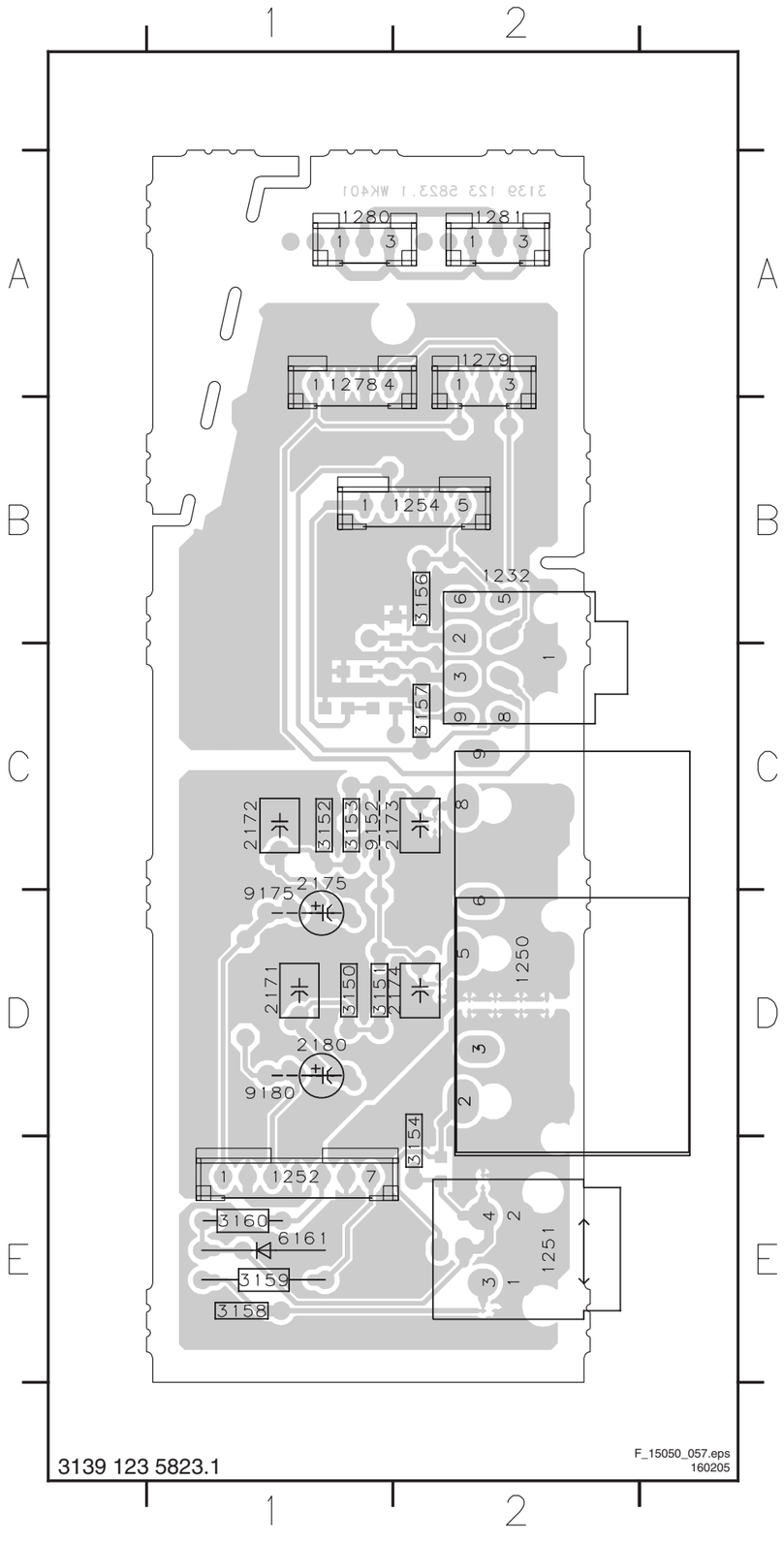
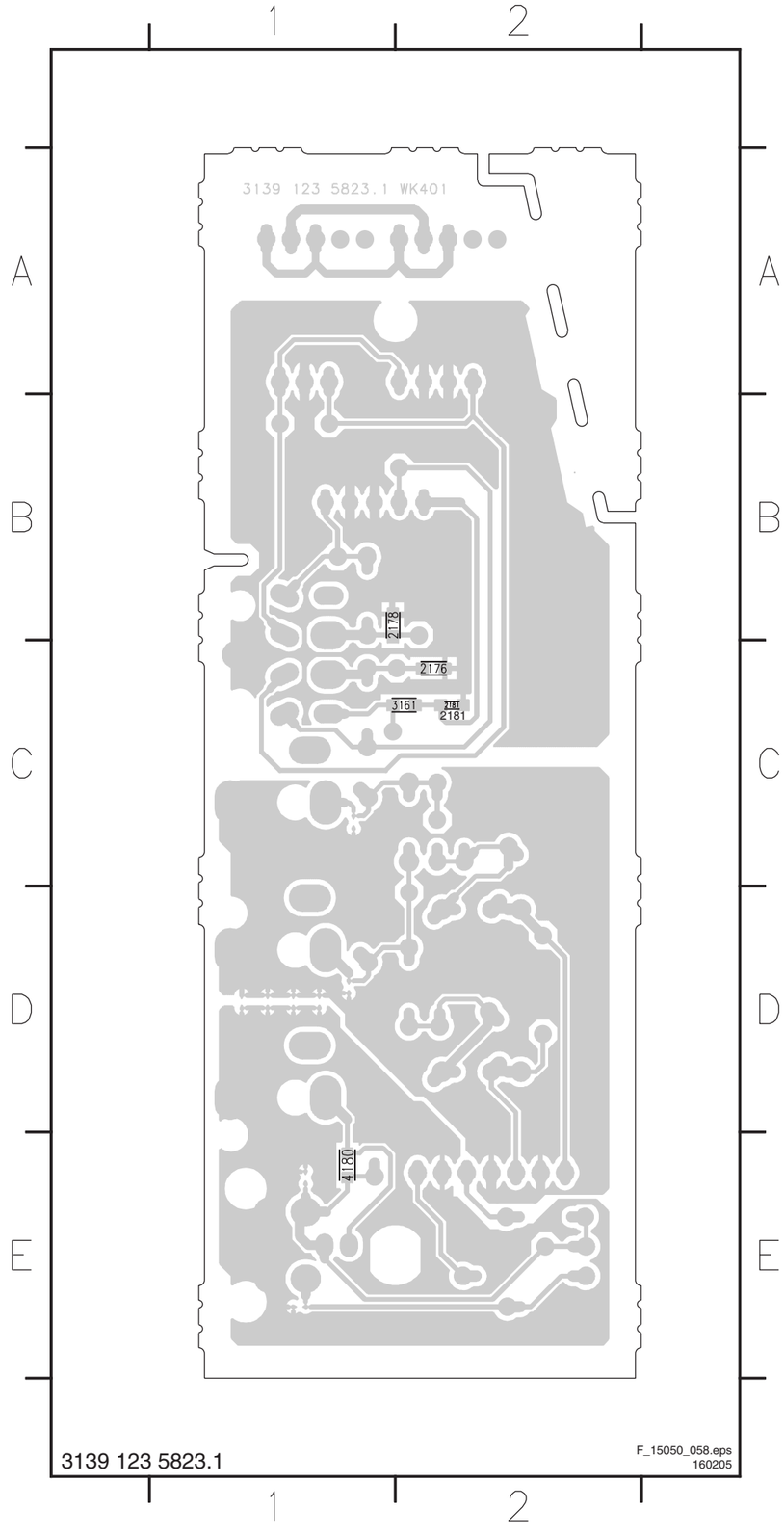
Layout Side AV + HP Panel (FL13) (Top Side)



1232 B2
1250 D2
1251 E2
1252 E1
1254 B2
1277 D2
1278 A1
1279 A2
1280 A1
1281 A2
2171 D1
2172 C1
2173 C1
2174 D2
2175 C1
2180 D1
3150 D1
3151 D1
3152 C1
3153 C1
3154 E2
3156 B2
3157 C2
3158 E1
3159 E1
3160 E1
6161 E1
9152 C1
9175 D1
9180 D1

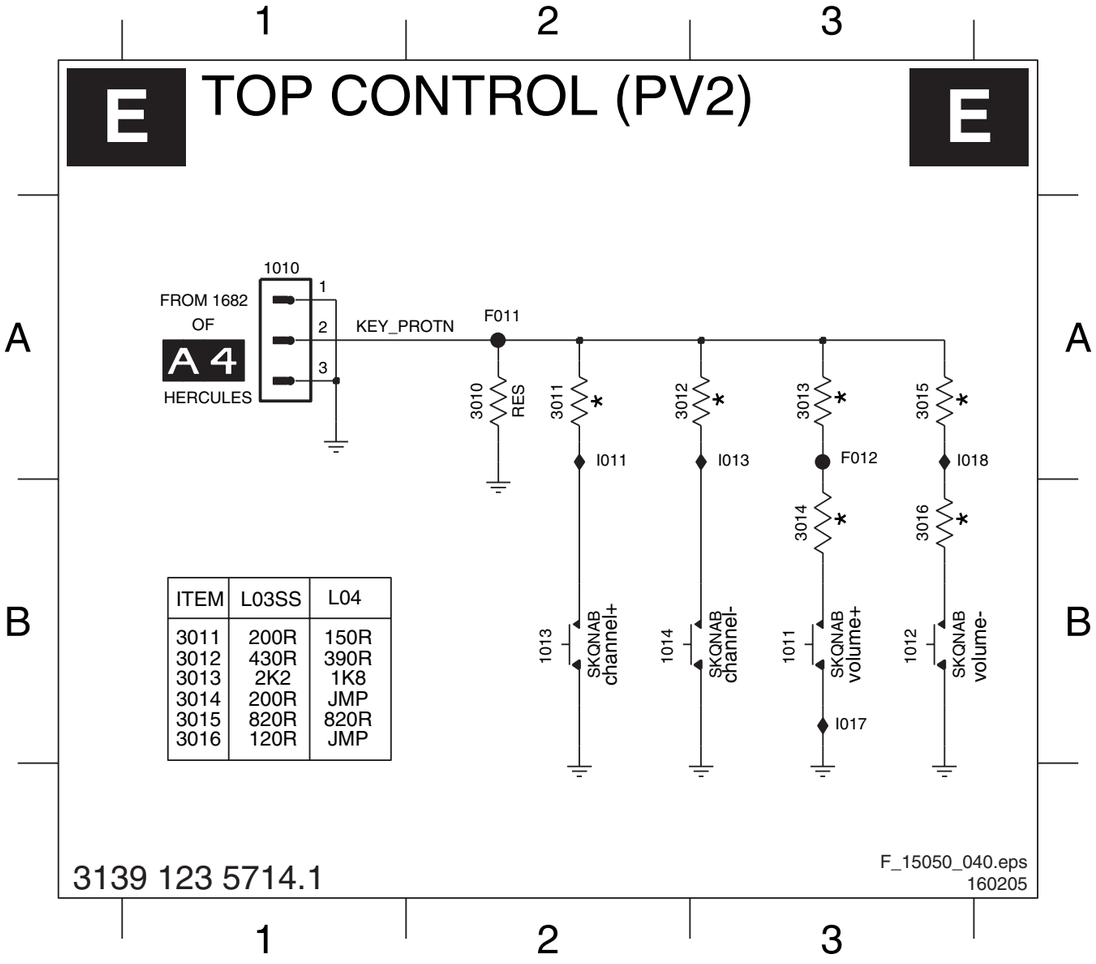
Layout Side AV + HP Panel (FL13) (Bottom Side)



2176 C2
2178 B1
2181 C2
3161 C2
4180 E1

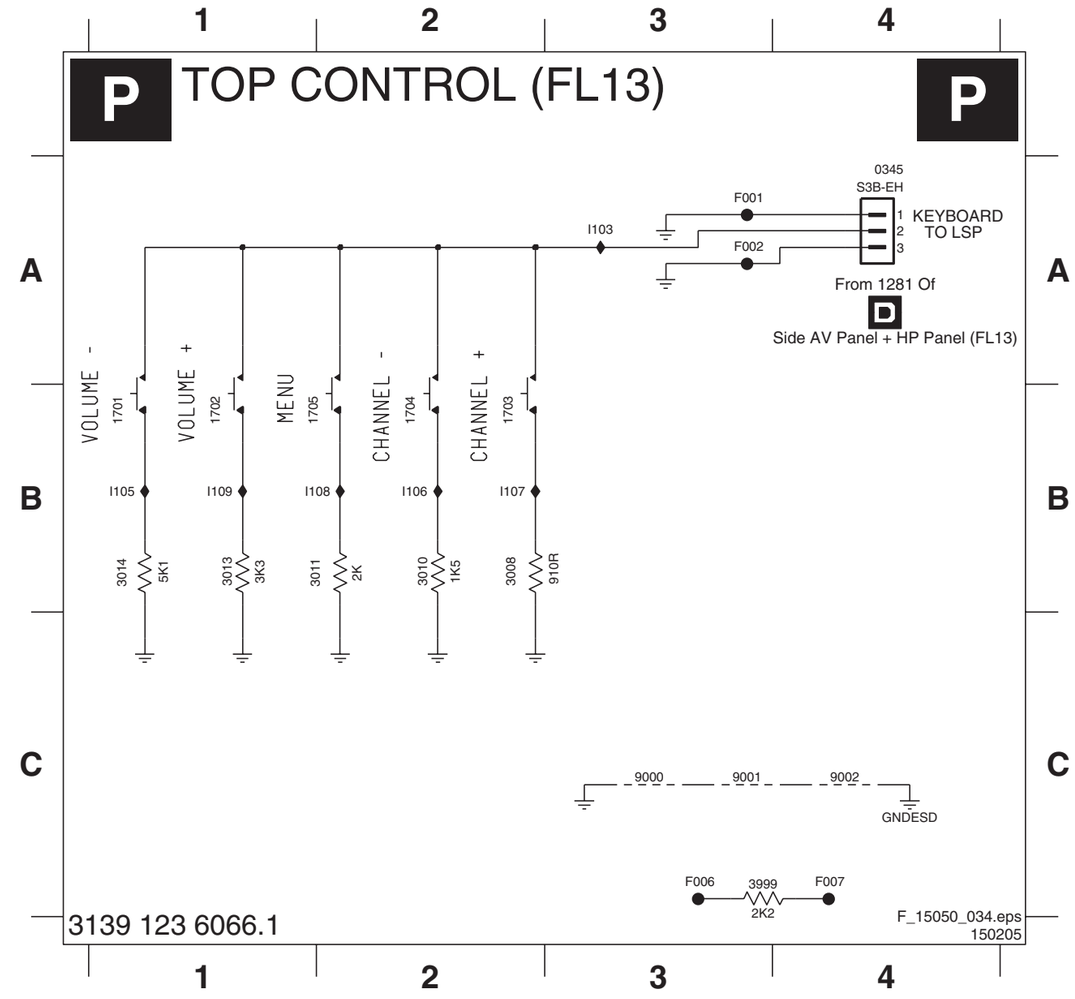
Top Control Panel (PV2)

1010 A1 1013 B2 3011 A2 3014 B3 F011 A2 I013 A3
1011 B3 1014 B2 3012 A2 3015 A3 F012 A3 I017 B3
1012 B3 3010 A2 3013 A3 3016 B3 I011 A2 I018 A3

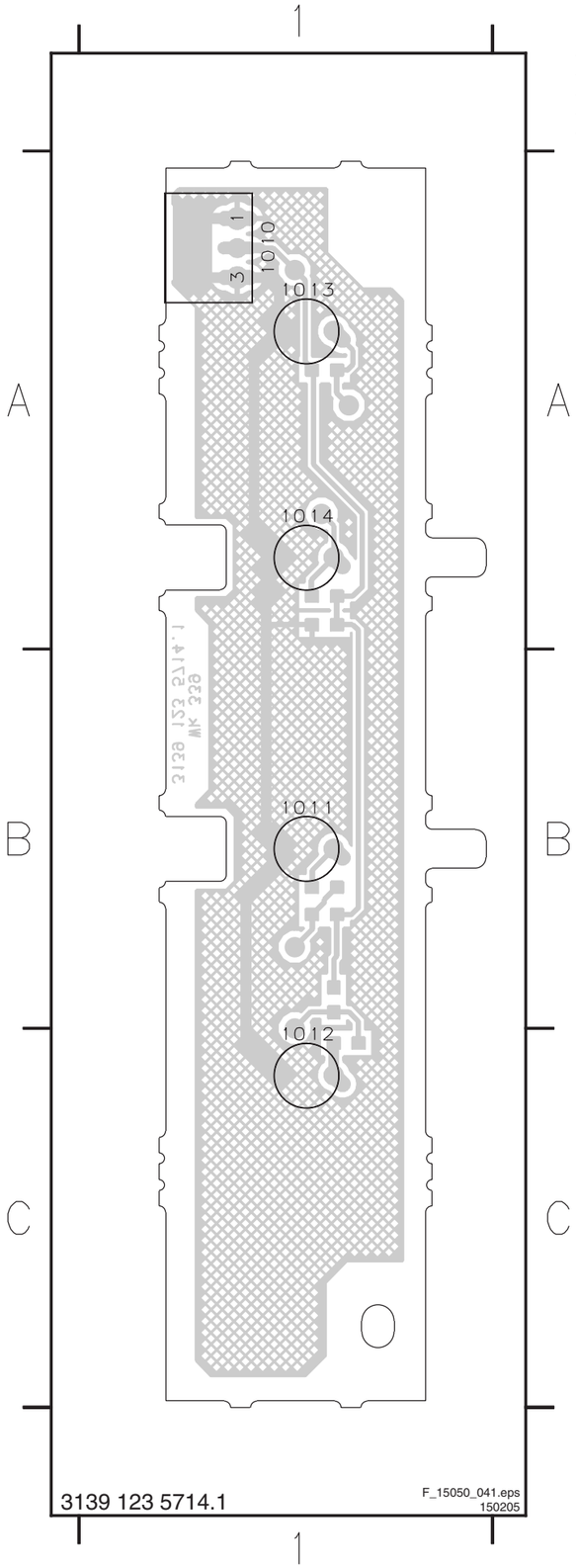


Top Control Panel (FL13)

0345 A4 1703 B2 3008 B2 3013 B1 9000 C3 F001 A3 F007 C4 I106 B2 I109 B1
1701 B1 1704 B2 3010 B2 3014 B1 9001 C3 F002 A3 I103 A3 I107 B2
1702 B1 1705 B2 3011 B1 3999 C3 9002 C4 F006 C3 I105 B1 I108 B2

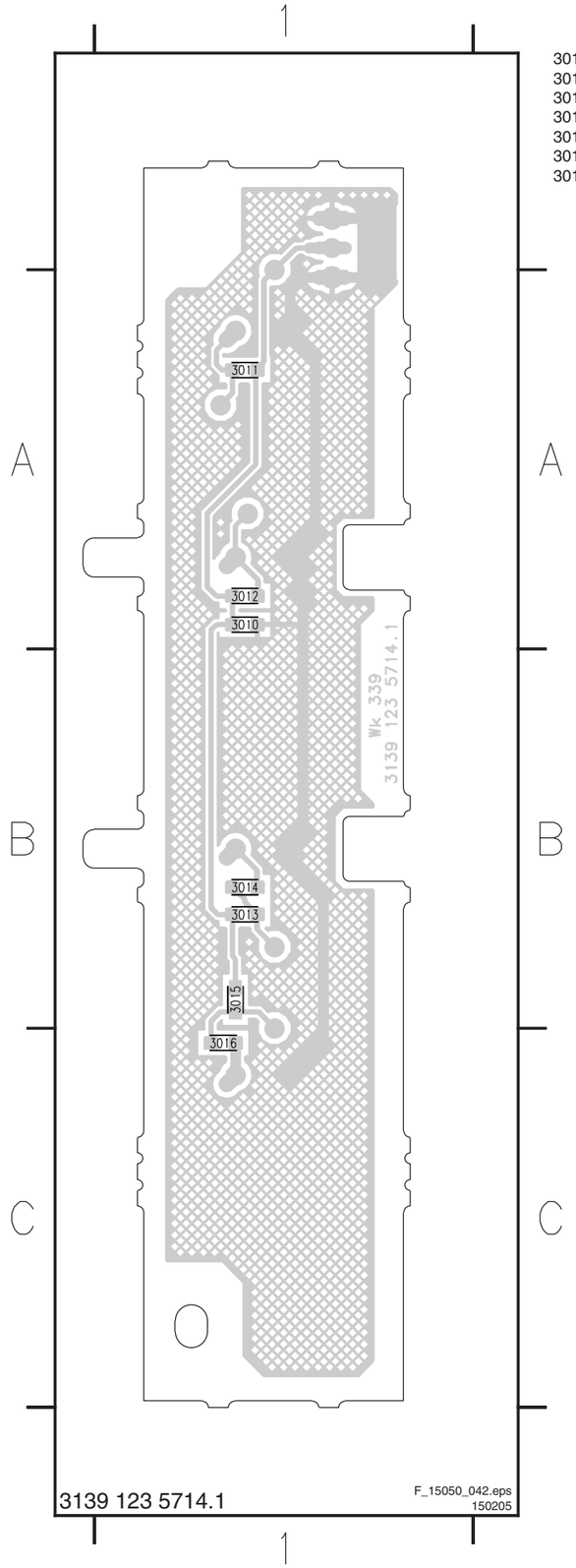


Layout Top Control Panel (PV2) (Top Side)



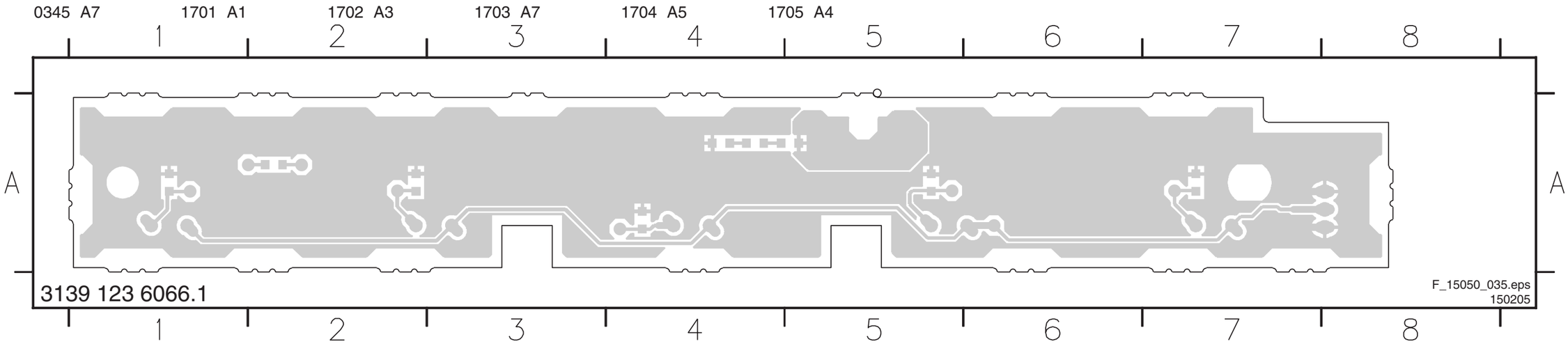
1010 A1
1011 B1
1012 C1
1013 A1
1014 A1

Layout Top Control Panel (PV2) (Bottom Side)

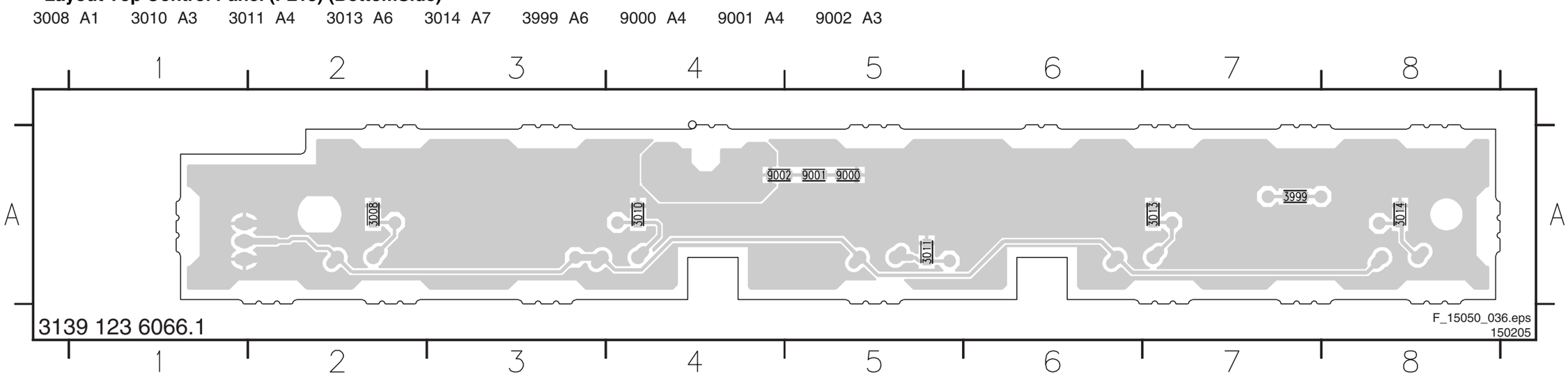


3010 A1
3011 A1
3012 A1
3013 B1
3014 B1
3015 B1
3016 C1

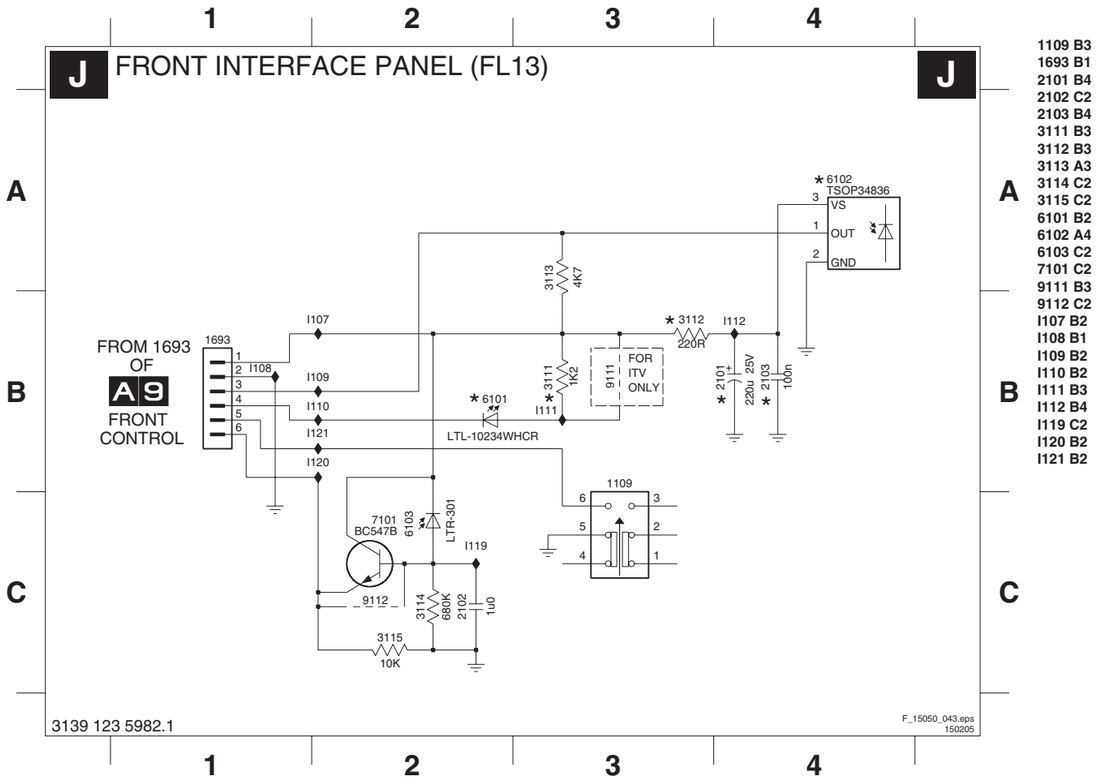
Layout Top Control Panel (FL13) (Top Side)



Layout Top Control Panel (FL13) (BottomSide)

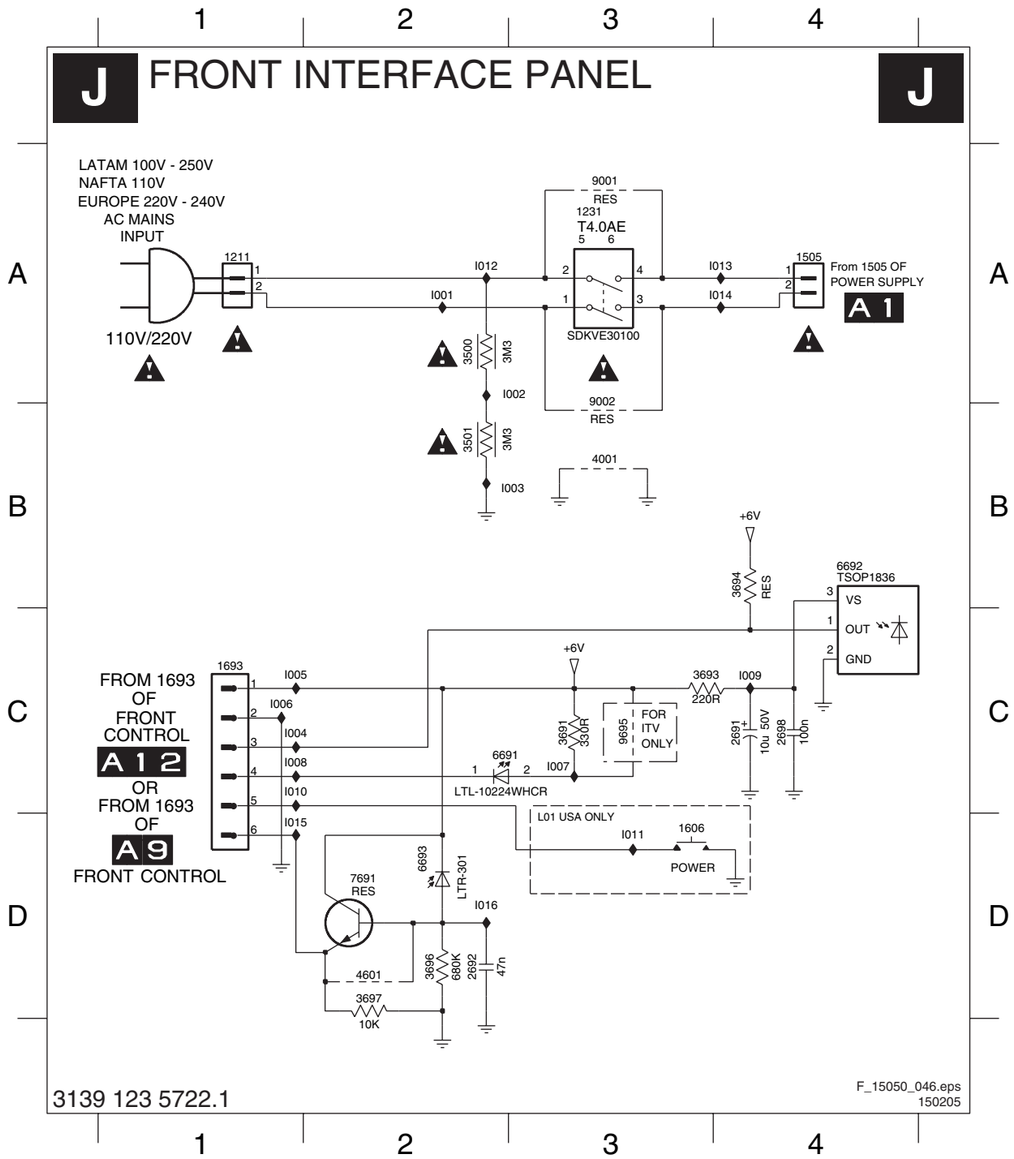


Front Interface Panel (FL13)



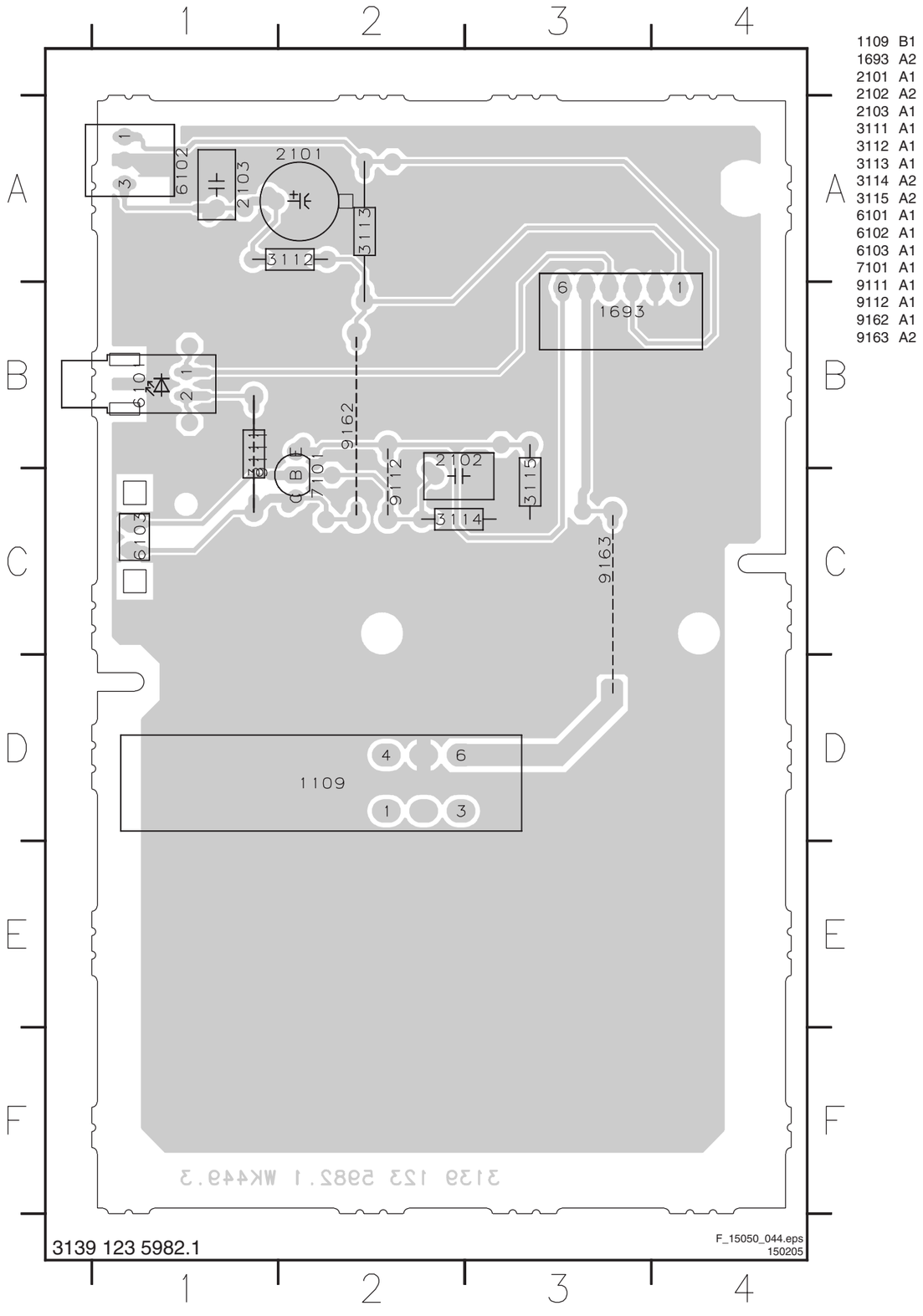
1109 B3
1693 B1
2101 B4
2102 C2
2103 B4
3111 B3
3112 B3
3113 A3
3114 C2
3115 C2
6101 B2
6102 A4
6103 C2
7101 C2
9111 B3
9112 C2
I107 B2
I108 B1
I109 B2
I110 B2
I111 B3
I112 B4
I119 C2
I120 B2
I121 B2

Front Interface Panel (PV2)

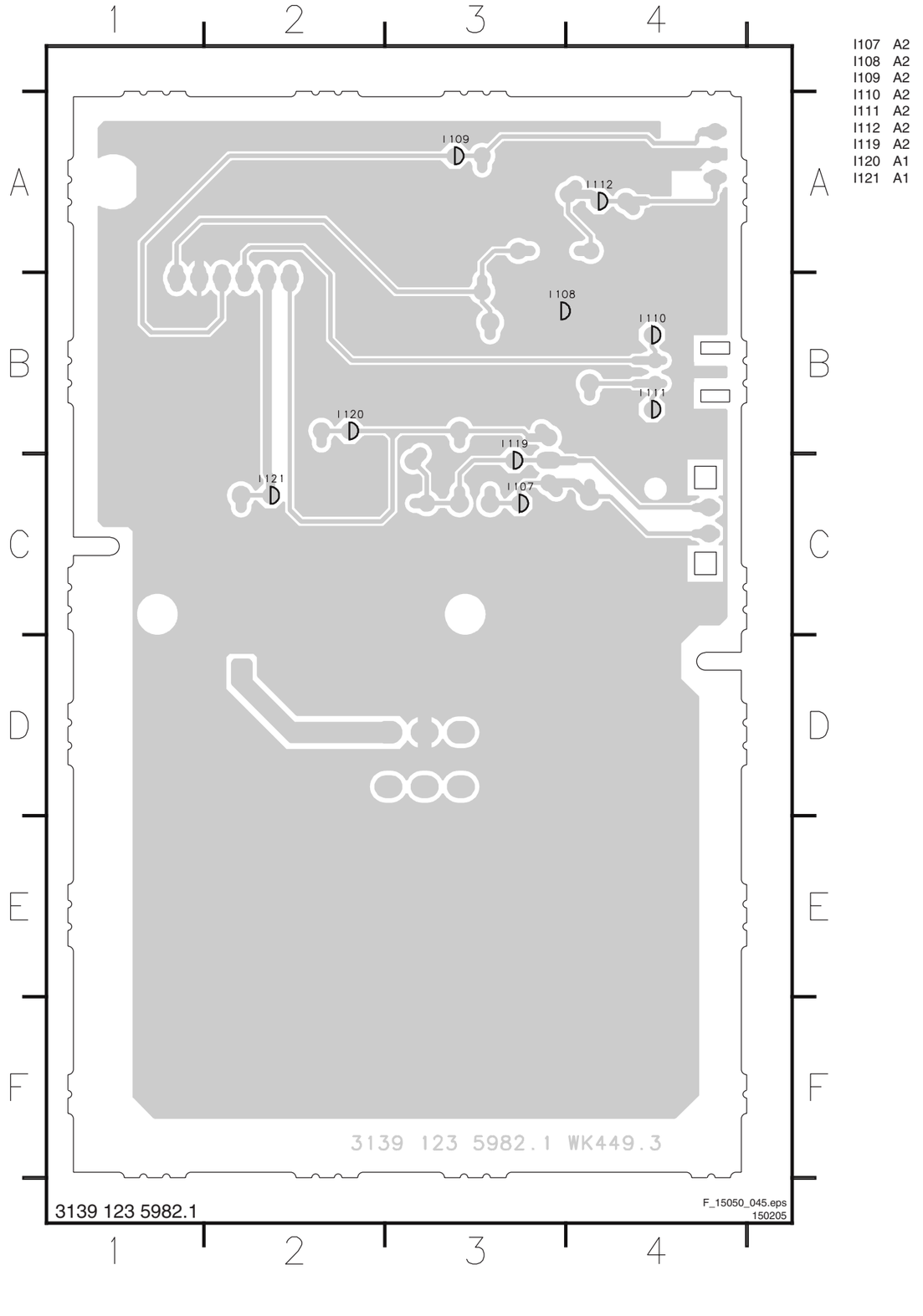


1211 A1
1231 A3
1505 A4
1606 D3
1693 C1
2691 C4
2692 D2
2698 C4
3500 A2
3501 B2
3691 C3
3693 C3
3694 B4
3696 D2
3697 D2
4001 B3
4601 D2
6691 C3
6692 B4
6693 D2
7691 D2
9001 A3
9002 B3
9695 C3
I001 A2
I002 A3
I003 B3
I004 C1
I005 C1
I006 C1
I007 C3
I008 C1
I009 C4
I010 C1
I011 D3
I012 A2
I013 A4
I014 A4
I015 D1
I016 D2

Layout Front Interface Panel (FL13) (Top Side)

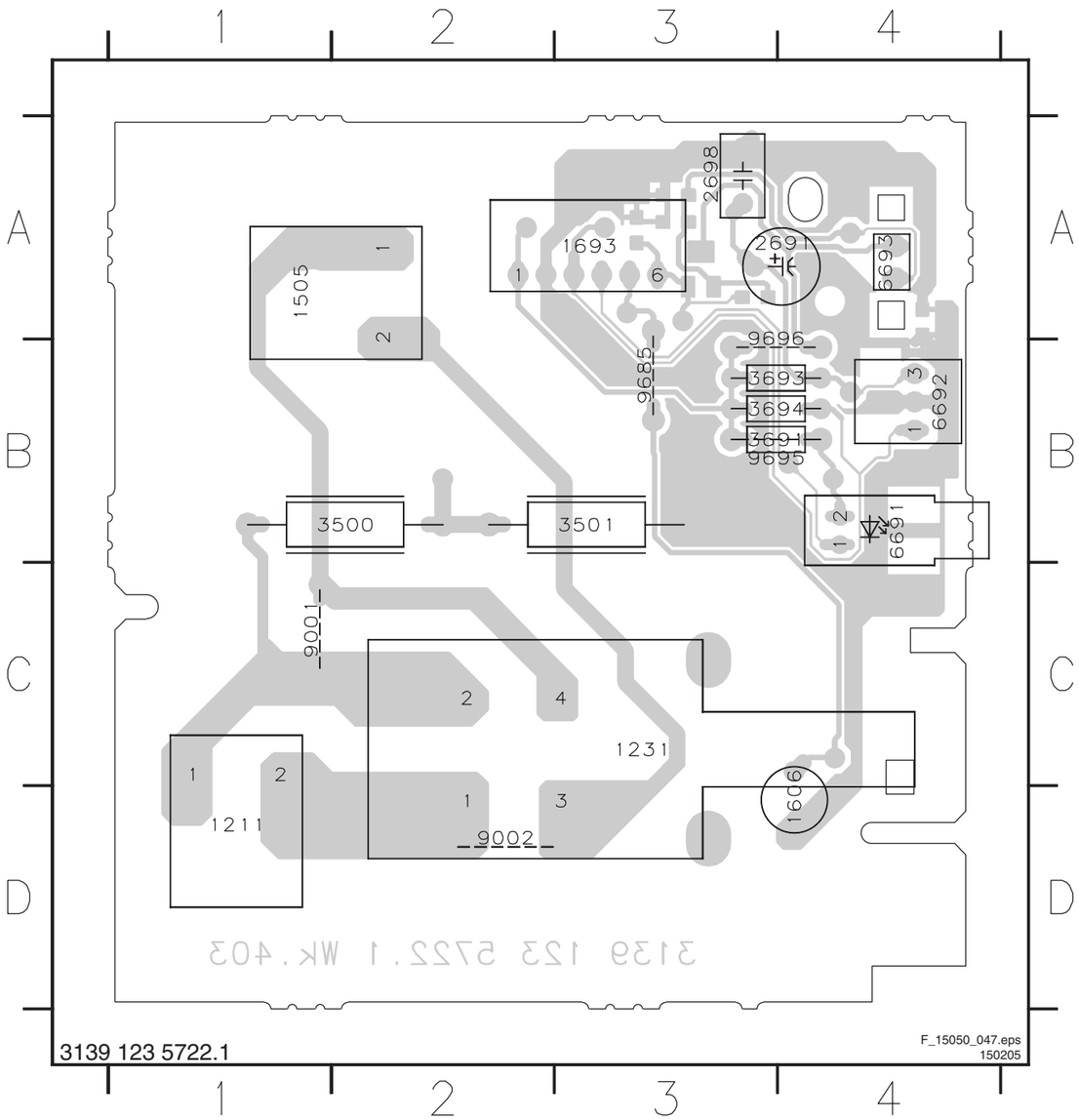


Layout Front Interface Panel (FL13) (Bottom Side)



Layout Front Interface Panel (PV2) (Top Side)

1211 D1 1231 C3 1505 A1 1606 D4 1693 A3 2691 A4 2698 A3 3500 B2 3501 B3 3691 B3 3693 B3 3694 B3 6691 B4 6692 B4 6693 A4 9001 C1 9002 D2 9685 B3 9695 B3 9696 A3



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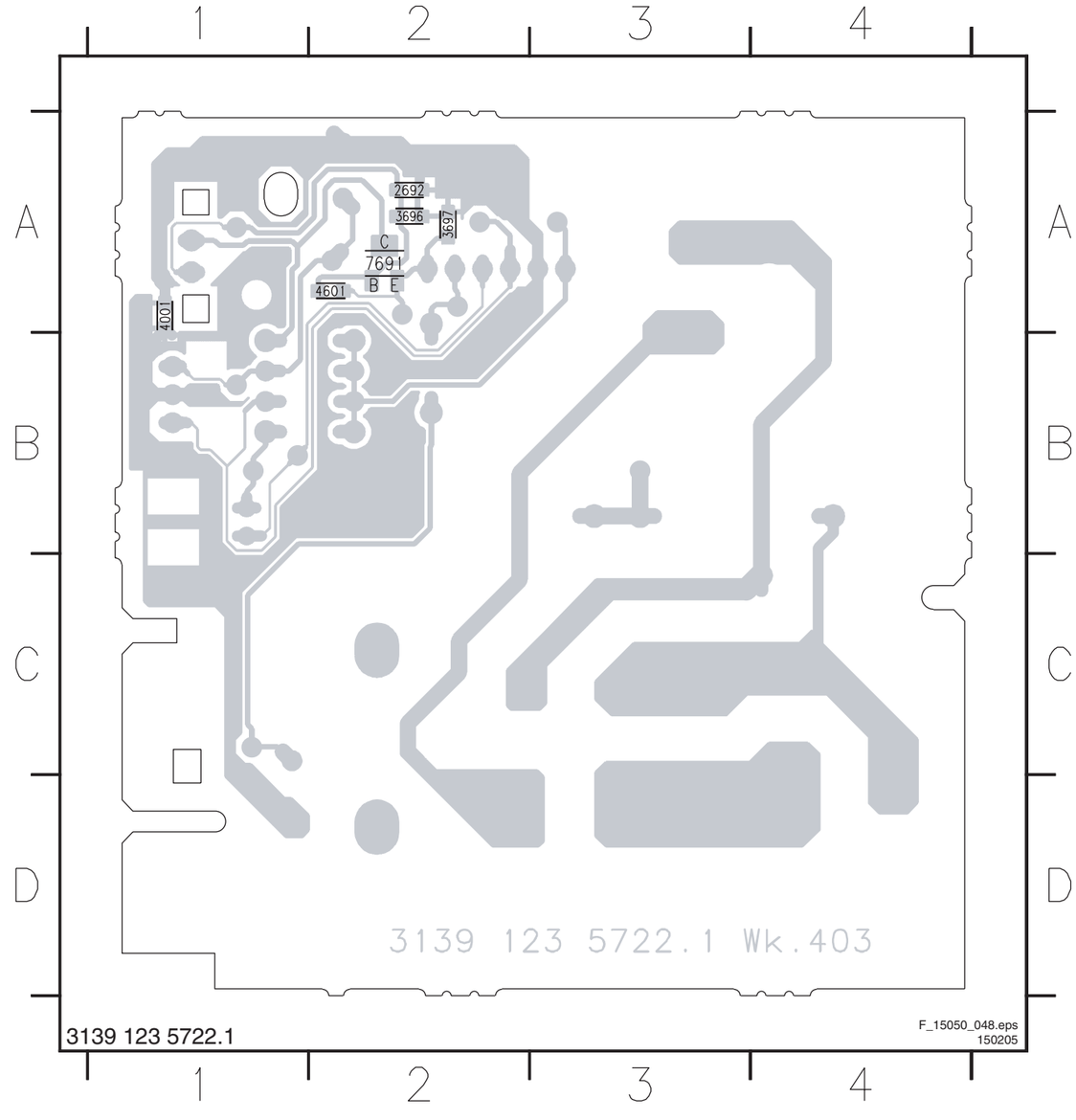
Layout Front Interface Panel (PV2) (Bottom Side)

2692 A2 3696 A2 3697 A2 4001 A1 4601 A2 7691 A2



3139 123 5722.1

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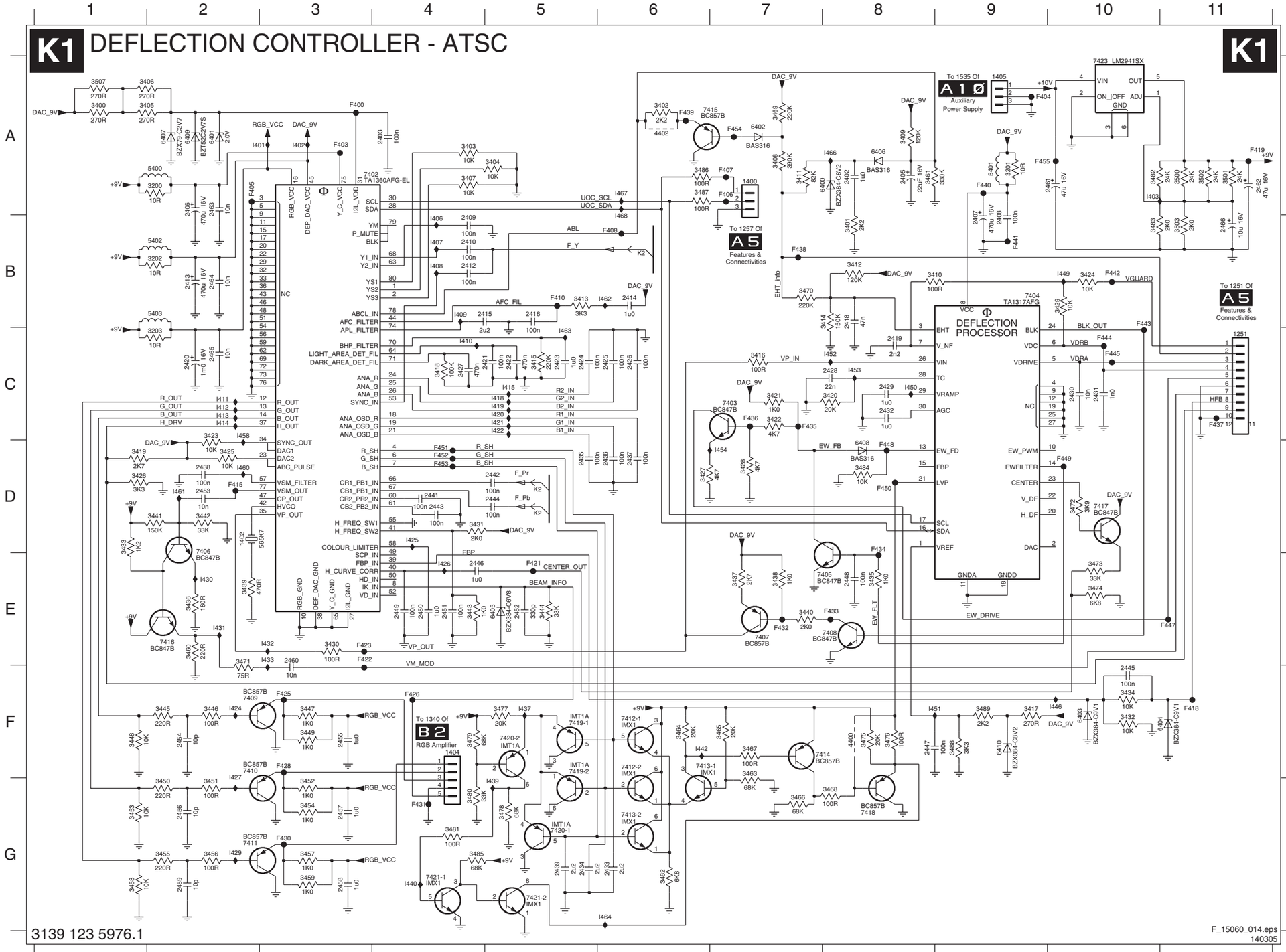
150205

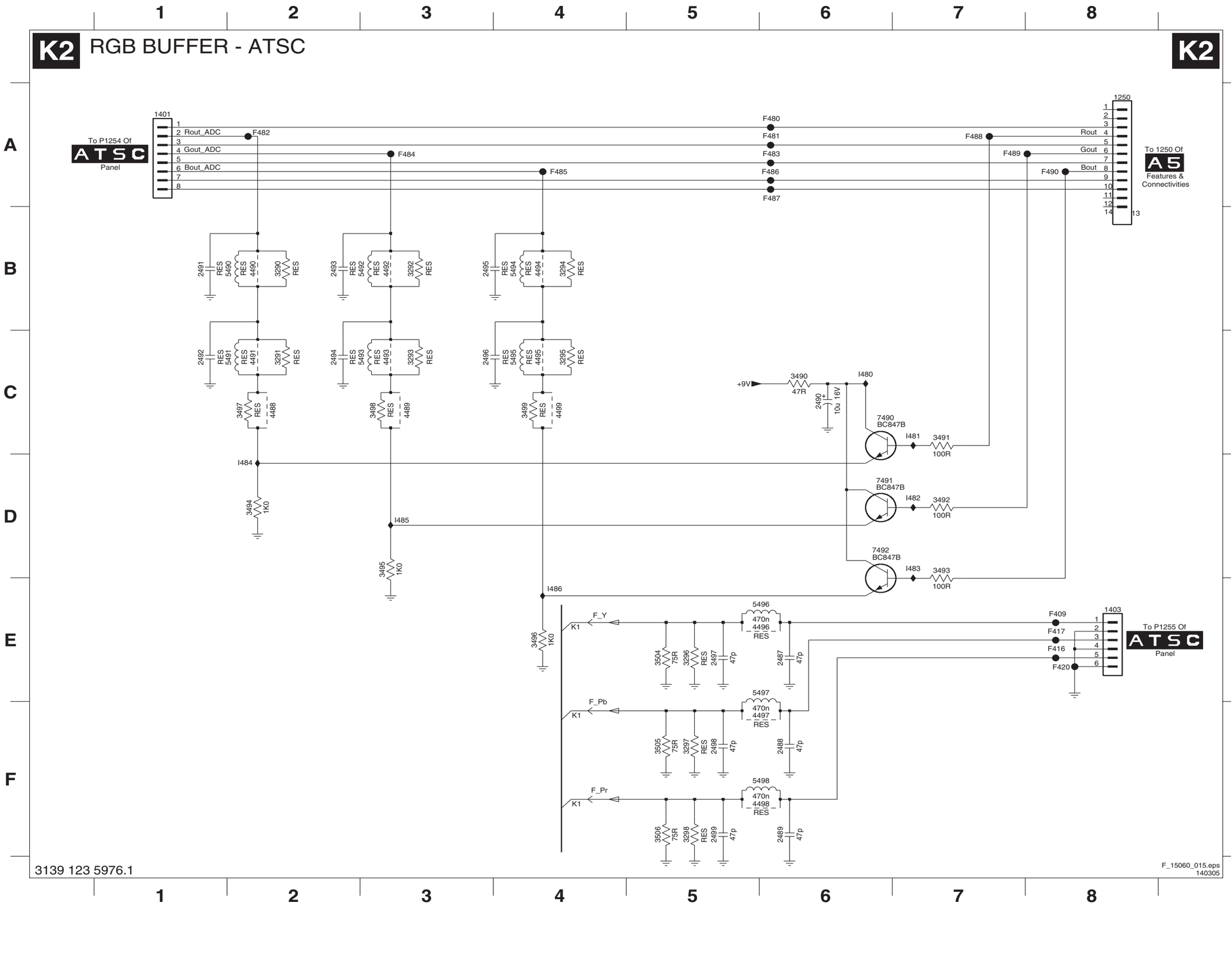
Deflection Controller - ATSC

K1 DEFLECTION CONTROLLER - ATSC



1251 C11	3425 D2	7410 F2	I452 C8
1400 A7	3426 D1	7411 G2	I453 C8
1402 D2	3427 D6	7412-1 F6	I454 D7
1404 F4	3428 D7	7412-2 F6	I458 C2
1405 A9	3429 B10	7413-1 F7	I460 D2
2402 A8	3430 E3	7413-2 G6	I461 D2
2403 A4	3431 D4	7414 F7	I462 B6
2405 A8	3432 F10	7415 A7	I463 C5
2406 A2	3433 D1	7416 E2	I464 G6
2407 B9	3434 F10	7417 D10	I466 A8
2408 B9	3435 E8	7418 G8	I467 A6
2409 B4	3436 E2	7419-1 F5	I468 B6
2410 B4	3437 E7	7419-2 F5	
2412 B4	3438 E7	7420-1 G5	
2413 B2	3439 E2	7420-2 F5	
2414 B6	3440 E7	7421-1 G4	
2415 B4	3441 D2	7421-2 G5	
2416 B5	3442 D2	7423 A10	
2418 B8	3443 E4	F400 A3	
2419 C8	3444 E5	F403 A3	
2420 C2	3445 F2	F404 A9	
2421 C5	3446 F2	F405 A2	
2422 C5	3447 F3	F406 A7	
2423 C5	3448 F1	F407 A7	
2424 C5	3449 F3	F408 B6	
2425 C6	3450 G2	F410 B5	
2426 C6	3451 G2	F415 D2	
2427 C4	3452 G3	F418 F11	
2428 C8	3453 G1	F419 A11	
2429 C8	3454 G3	F421 E5	
2430 C10	3455 G2	F422 E3	
2431 C10	3456 G2	F423 E3	
2432 C8	3457 G3	F425 F3	
2433 G6	3458 G1	F426 F4	
2434 G5	3459 G3	F428 F3	
2435 D5	3460 E2	F430 G3	
2436 D6	3461 A8	F431 G4	
2437 D6	3462 G6	F432 E7	
2438 D2	3463 F7	F433 E8	
2439 G5	3464 F6	F434 D8	
2441 D4	3465 F7	F435 C7	
2442 D5	3466 G7	F436 C7	
2443 D4	3467 F7	F437 C11	
2444 D5	3468 G8	F438 B7	
2445 F10	3469 A7	F439 A6	
2446 E4	3470 B7	F440 A9	
2447 F8	3471 E2	F441 B9	
2448 E8	3472 D10	F442 B10	
2449 E4	3473 E10	F443 B10	
2450 E4	3474 E10	F444 C10	
2451 E4	3475 F8	F445 C10	
2452 E5	3476 F8	F447 E11	
2453 D2	3477 F5	F448 D8	
2454 F2	3478 G5	F449 D10	
2455 F3	3479 F4	F450 D8	
2456 G2	3480 G4	F451 D4	
2457 G3	3481 G4	F452 D4	
2458 G3	3482 A10	F453 D4	
2459 G2	3483 B10	F454 A7	
2460 E3	3484 D8	F455 A9	
2461 A10	3485 G4	I401 A2	
2462 A11	3486 A6	I402 A3	
2463 A2	3487 A6	I403 A10	
2464 B2	3488 F9	I406 B4	
2465 C2	3489 F9	I407 B4	
2466 B11	3500 A11	I408 B4	
3200 A2	3501 A11	I409 B4	
3201 A9	3502 A11	I410 C4	
3202 B2	3503 B11	I411 C2	
3203 C2	3507 A1	I412 C2	
3400 A1	4400 F8	I413 C2	
3401 B8	4402 A6	I414 C2	
3402 A6	5400 A2	I415 C5	
3403 A4	5401 A9	I418 C5	
3404 A5	5402 B2	I419 C5	
3405 A1	5403 B2	I420 C5	
3406 A1	6400 A8	I421 C5	
3407 A4	6401 A2	I422 C5	
3408 A7	6402 A7	I424 F2	
3409 A8	6403 F10	I425 D4	
3410 B8	6404 F11	I426 E4	
3411 A7	6405 E5	I427 F2	
3412 B8	6406 A8	I429 G2	
3413 B5	6407 A2	I430 E2	
3414 B8	6408 D8	I431 E2	
3415 C5	6409 A2	I432 E3	
3416 C7	6410 F9	I433 E3	
3417 F9	7402 A3	I437 F5	
3418 C4	7403 C7	I439 G5	
3419 D1	7404 B9	I440 G4	
3420 C8	7405 E7	I442 F6	
3421 C7	7406 E2	I446 F10	
3422 C7	7407 E7	I449 B10	
3423 C2	7408 E8	I450 C8	
3424 B10	7409 F2	I451 F8	

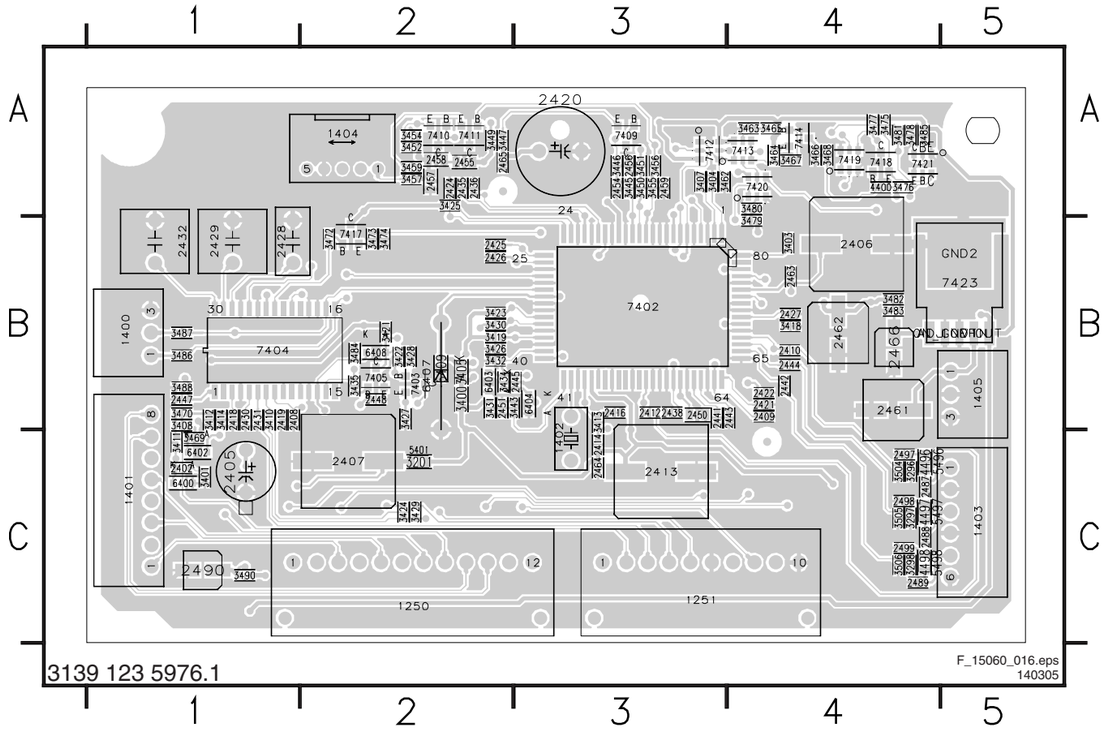
RGB Buffer- ATSC



1250 A8 I485 D3
1401 A1 I486 E4
1403 E8
2487 E6
2488 F6
2489 F6
2490 C6
2491 B1
2492 C1
2493 B2
2494 C2
2495 B3
2496 C3
2497 E5
2498 F5
2499 F5
3290 B2
3291 C2
3292 B3
3293 C3
3294 B4
3295 C4
3296 E5
3297 F5
3298 F5
3490 C6
3491 C7
3492 D7
3493 D7
3494 D2
3495 D3
3496 E4
3497 C2
3498 C3
3499 C4
3504 E5
3505 F5
3506 F5
4488 C2
4489 C3
4490 B2
4491 C2
4492 B3
4493 C3
4494 B4
4495 C4
4496 E6
4497 F6
4498 F6
4499 C4
5490 B2
5491 C2
5492 B3
5493 C3
5494 B4
5495 C4
5496 E6
5497 E6
5498 F6
7490 C7
7491 D7
7492 D6
F409 E8
F416 E8
F417 E8
F420 E8
F480 A6
F481 A6
F482 A2
F483 A6
F484 A3
F485 A4
F486 A6
F487 A6
F488 A7
F489 A7
F490 A8
I480 C6
I481 C7
I482 D7
I483 D7
I484 D2

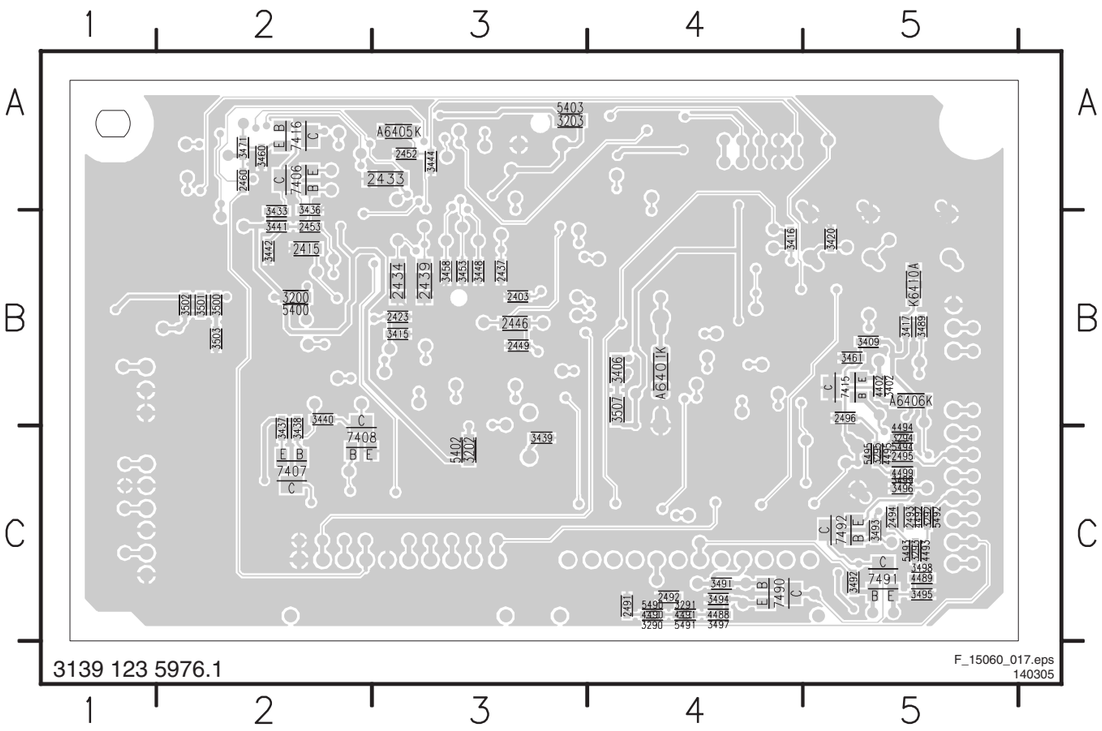
Layout Deflection Controller (Top Side)

1250 C2 2408 B1 2424 A2 2441 B3 2457 A2 2490 C1 3405 B2 3423 B2 3443 B3 3459 A2 3474 B2 3486 B1 5496 C4 7404 B1 7421 A4
1251 C3 2409 B4 2425 B2 2442 B4 2458 A2 2497 C4 3407 A3 3424 C2 3445 A3 3462 A3 3475 A4 3487 B1 5497 C4 7405 B2 7423 B5
1400 B1 2410 B4 2426 B2 2443 B4 2459 A3 2498 C4 3408 B1 3425 A2 3446 A3 3463 A4 3476 A4 3488 B1 5498 C4 7409 A3
1401 C1 2412 B3 2427 B4 2444 B4 2461 B4 2499 C4 3410 B1 3426 B2 3447 A2 3464 A4 3477 A4 3490 C1 6400 C1 7410 A2
1402 C3 2413 C3 2428 B1 2445 B3 2462 B4 3201 C2 3411 C1 3427 B2 3449 A2 3465 A4 3478 A4 3504 C4 6402 C1 7411 A2
1403 C5 2414 C3 2429 B1 2447 B1 2463 B4 3296 C4 3412 B1 3428 B2 3450 A3 3466 A4 3479 B4 3505 C4 6403 B2 7412 A3
1404 A2 2416 B3 2430 B1 2448 B2 2464 C3 3297 C4 3413 B3 3429 C2 3451 A3 3467 A4 3480 A4 3506 C4 6404 B3 7413 A4
1405 B5 2418 B1 2431 B1 2450 B3 2465 A2 3298 C4 3414 B1 3430 B2 3452 A2 3468 A4 3481 A4 4400 A4 6407 B2 7414 A4
2402 C1 2419 B1 2432 B1 2451 B2 2466 B4 3400 B2 3418 B4 3431 B2 3454 A2 3469 C1 3482 B4 4496 C4 6408 B2 7417 B2
2405 C1 2420 A3 2435 A2 2454 A3 2487 C4 3401 C1 3419 B2 3432 B2 3455 A3 3470 B1 3483 B4 4497 C4 6409 B2 7418 A4
2406 B4 2421 B4 2436 A2 2455 A2 2488 C4 3403 B4 3421 B2 3434 B2 3456 A3 3472 B2 3484 B2 4498 C4 7402 B3 7419 A4
2407 C2 2422 B4 2438 B3 2456 A3 2489 C4 3404 A3 3422 B2 3435 B2 3457 A2 3473 B2 3485 A4 5401 C2 7403 B2 7420 A4

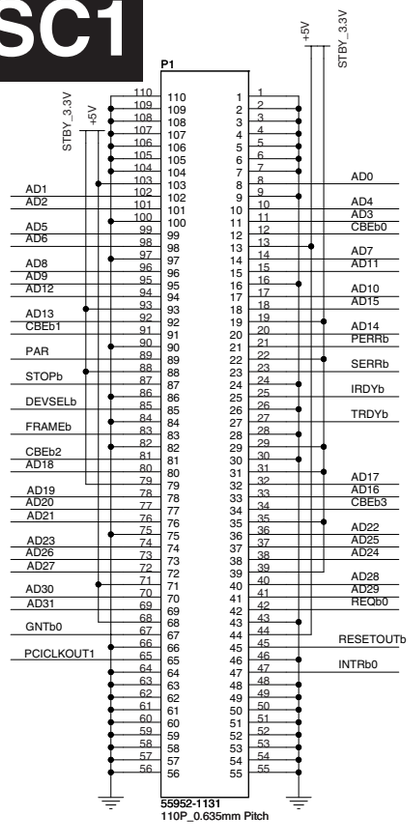


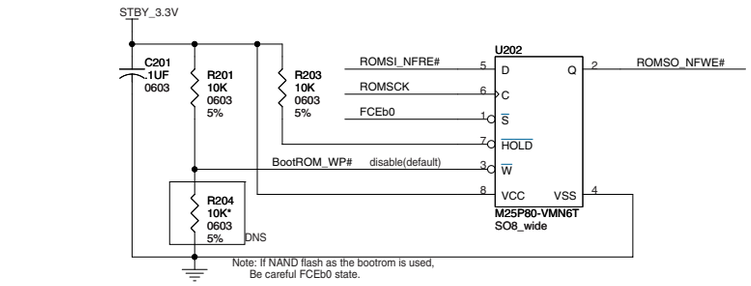
Layout Deflection Controller (Bottom Side)

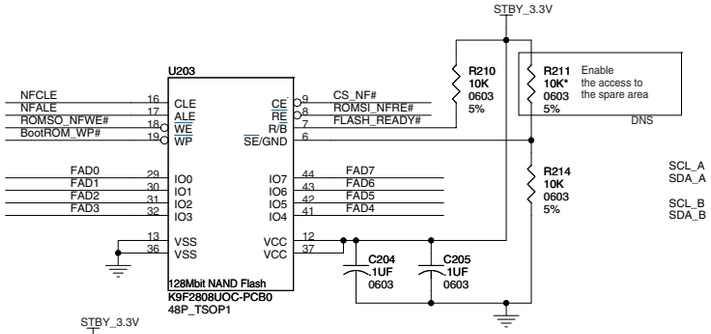
2403 B3 2446 B3 2493 C5 3290 C4 3406 B4 3436 A2 3444 A3 3489 B5 3497 C4 3507 B4 4493 C5 5490 C4 6405 A3 7416 A2
2415 B2 2449 B3 2494 C5 3291 C4 3409 B5 3437 C2 3448 B3 3491 C4 3498 C5 4402 B5 4494 C5 5491 C4 6406 B5 7490 C4
2423 B3 2452 A3 2495 C5 3292 C5 3415 B3 3438 C2 3453 B3 3492 C5 3499 C5 4488 C4 4495 C5 5492 C5 6410 B5 7491 C5
2433 A3 2453 B2 2496 B5 3293 C5 3416 B4 3439 C3 3458 B3 3493 C5 3500 B2 4489 C5 4499 C5 5493 C5 7406 A2 7492 C5
2434 B3 2460 A2 3200 B2 3294 C5 3417 B5 3440 B2 3460 A2 3494 C4 3501 B2 4490 C4 5400 B2 5494 C5 7407 C2
2437 B3 2491 C4 3202 C3 3295 C5 3420 B5 3441 B2 3461 B5 3495 C5 3502 B2 4491 C4 5402 C3 5495 C5 7408 C2
2439 B3 2492 C4 3203 A3 3402 B5 3433 B2 3442 B2 3471 A2 3496 C5 3503 B2 4492 C5 5403 A3 6401 B4 7415 B5

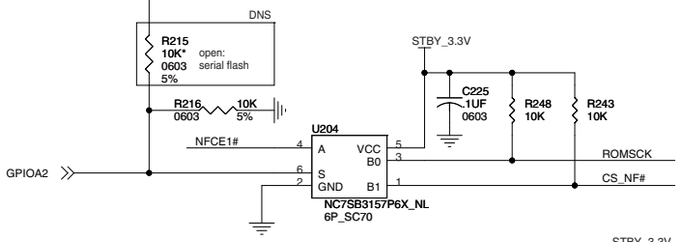


ATSC1

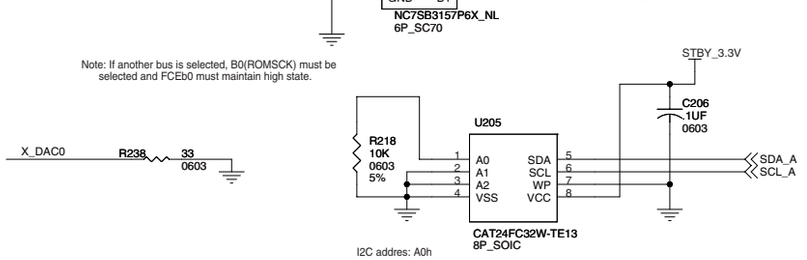


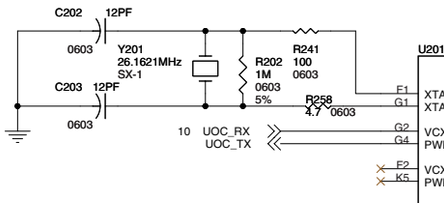


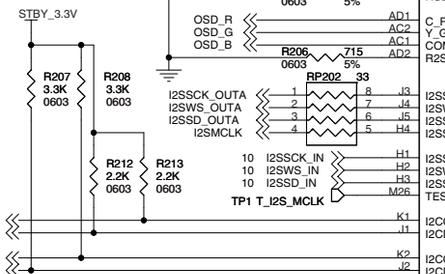


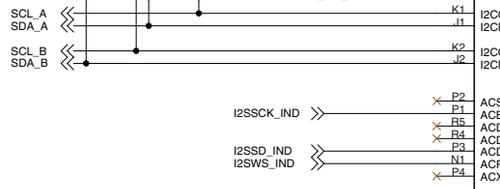


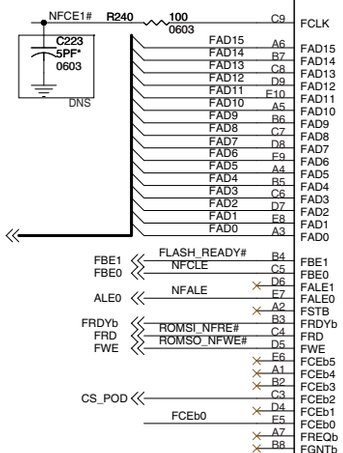
Note: If another bus is selected, B0(ROMSCK) must be selected and FCEb0 must maintain high state.

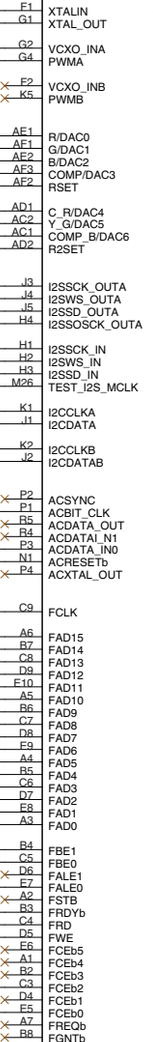




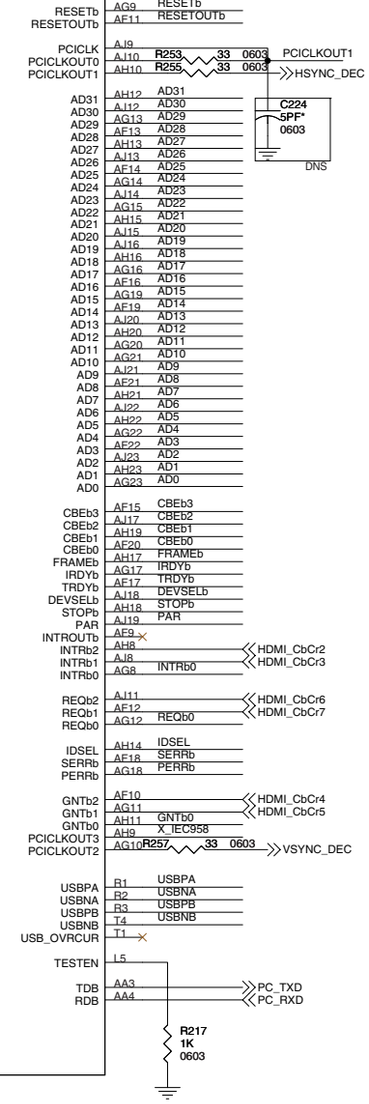




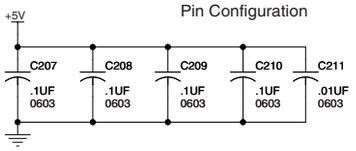


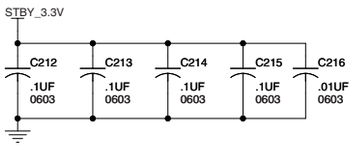


The loopback clock line has to be matching length with the length go to other PCI devices

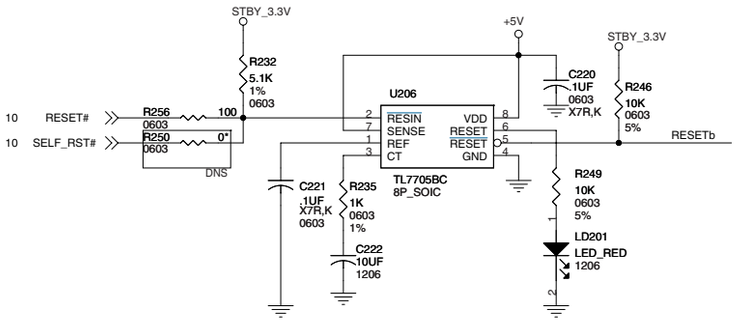


55952 CONNECTOR
Pin Configuration





RESET GENERATOR

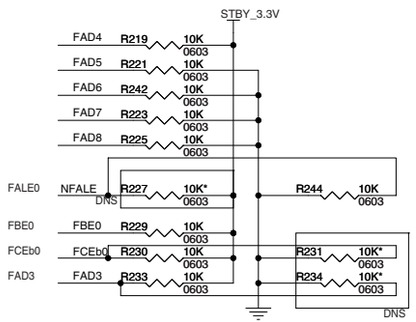


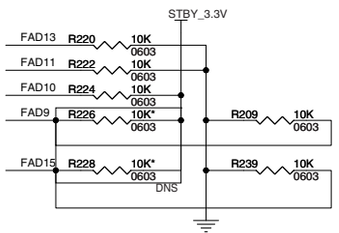
FAD4: 0: ROM enable, 1: ROM disable(default)
Boot vector
FAD(6:5) 00 - MIPS (Default), 01 - X86 Family
10 - SH Family, 11-Strong ARM Family

SYS CFG
FAD(8:7) 00 - SOLO (Default), 01 - Reserved
10 - PEER, 11 - PEER+

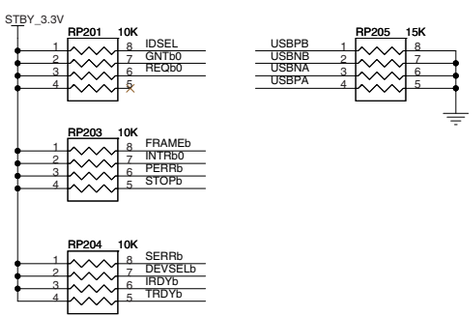
BootROM Device Selects

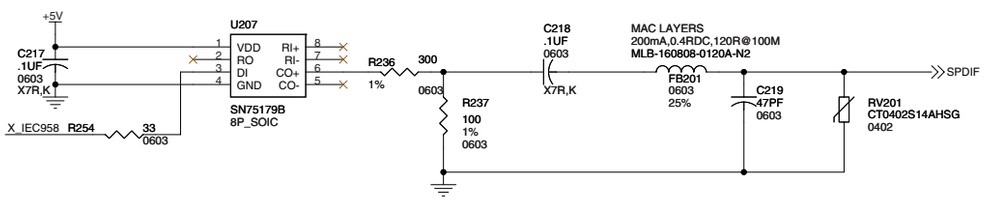
	NAND_flash	M25P80	M25P40
FALE0	0	0	1
FBE0	1	1	1
FCEb0	0	1	0
FAD3	0	1	1





STRAP_ID(4:0) {FAD13, FAD11, FAD10, FAD9, FAD15}
00000 - Reserved
00100 - X210V
00111 - X210VC





XXXX XXX XXXX.X

F_15060_019.eps
150305

ATSC2

STBY_3.3V
R325 1K 0603
TP_ERR
R326 220 0603
LD301 LED_RED 0603

+5V
FB301 MLB-160808-0120P-N2* 0603
C319 .1UF* 0603
R319 10K* 0603
C322 1000PF* 0603
FDC_IFP
C323 1000PF* 0603
FDC_IFN
R320 2K* 0603

U301
VCC IF_IN1 IF_IN2 AGC_IN
GND IF_O1 IF_O2 SW
LA7795T*
8P_MSOP
DNS in a BASIC

IF_P
C301 .1UF X7R,K 0603
R301 200 0603
IF_N
C305 .1UF X7R,K 0603
R302 200 0603
C307 .1UF X7R,K 0603
C308 1000PF X7R,K 0603
C302 1000PF 0603

C311 .1UF* X7R,K 0603
C313 .1UF X7R,K 0603
R304 200* 0603
R305 200* 0603
C309 1000PF* X7R,K 0603
C315 .1UF* X7R,K 0603
C316 1000PF* X7R,K 0603
DNS in a BASIC

FB1222 MLB-160808-0120A-N2 0603
FDC_AGC
R306 1K* 0603 XFDC_AGC
C318 1UF X7R,K 0603
DNS in a BASIC

STBY_3.3V
DNS
R307 0* 5% 0603
R308 0 5% 0603
HW_BIT2
R309 0 5% 0603
R310 0* 5% 0603
HW_BIT1
R311 0* 5% 0603
R312 0 5% 0603
HW_BIT0
R313 0* 5% 0603
R314 0 5% 0603
STEP
R315 0* 5% 0603
R316 0 5% 0603
DNS in BASIC
DNS in STEP

Board	Schematic	H/W BIT
R0.7	0.7X	0011
R0.8	0.8X	0100

STBY_3.3V
DNS
R332 10K* 5% 0603
TEST_MODE_M27
R333 10K 5% 0603

IF_AGC
R318 1K 0603 AGC_SDM1
C321 1UF 0603

C325 33PF 0603
OSC_XTAL_IN
Y301 25.14MHz SX-1 +/-20PPM
R321 100 0603
C326 33PF 0603
OSC_XTAL_O
R335 4.7 0603

U201B

HDMI_DE
INT_POD
AGC_SDM1
OSC_XTAL_IN
OSC_XTAL_O
TEST_MODE_M27
XFDC_AGC
FDC_CRX
FDC_DRX
MPEG_D[7:0]
MPG_CLK
MPG_SYNC
MPG_DATA_EN
TP_ERR
TCLKA
TDATA[7:0]
TSTRTA
TVLDA
TERA is internal pull-down

R303 715 0603
R331 33 0603
RP301 33*
RP302 33*
R324 33*
R323 33*
R322 33*

AF7	TDA	
AG7	RDA	
R25	SMVCCA	
T25	SMRSTS	
M29	NRSSCLKA	
A21	AGC_SDMX	FAT Interface
A22	AGC_SDM1	
A23	AGC_SDM2	
F26	ADC0_INP	
E25	ADC0_INN	
K25	ADC0_REFP	
K26	ADC0_REFN	
F25	ADC0_VCM	
C20	OSC_XTAL_IN	
D20	OSC_XTAL_O	
D19	O_OSC_CLK	
E12	DAC0_RSET	
D13	DAC0_OUT	
M27	TEST_MODE_M27	
E17	I2CSLVADDR1	CVBS
B20	I2CSLVADDR0	
E24	ADC1_INP	
E22	ADC1_INN	
H26	ADC1_REFP	
H25	ADC1_REFN	
E23	ADC1_VCM	
A19	FS_OUTP	
A18	FS_OUTN	Tuner
A20	FDC_AGC	
A17	FDC_CRX	
B17	FDC_DRX	
B13	MPEG_D7	
A13	MPEG_D6	
A15	MPEG_D5	
C16	MPEG_D4	
C15	MPEG_D3	
B15	MPEG_D2	
B16	MPEG_D1	
A16	MPEG_D0	POD interface
A14	MPEG_CLK	
C14	MPEG_SYNC	
C13	MPEG_DATA_EN	
B14	MPEG_ERR	
B1	TCLKA	
C1	TDATA7	
C2	TDATA6	
D1	TDATA5	
D2	TDATA4	
D3	TDATA3	
E1	TDATA2	
E2	TDATA1	
E3	TDATA0	TP Pins
F4	TSTRTA	
F5	TVLDA	
F4	TERA	
D17	NC_D17	
C17	NC_C17	
P25	NC_P25	
P26	SMCLKA	
P27	SMRSTA	
P28	SMDETECTA	
P29	SMDATA	

X210VC
633P_BGA

N2	GPIOA0	OOB_EN
N3	GPIOA1	POD_PS
N4	GPIOA2	GPIOA2
N5	GPIOA3	A_SEL
M1	GPIOA4	HDMI_PD
M2	GPIOA5	AVIDEO_PD
M3	GPIOA6	AIN_RST#
M4	GPIOA7	HDMI_INT
L1	GPIOA8	PWR_DN TP72
L2	GPIOA9	
L3	GPIOA10	
L4	GPIOA11	
K3	GPIOA12	TP52 PROBE_CLK
K4	GPIOA13	
AJ4	GPIOB0	HDMI_P_CLK
AJ6	GPIOB1	HDMI_CbCr0
AJ5	GPIOB2	HDMI_CbCr1
AJ7	GPIOB3	HDMI_Y[7:0]
AG4	GPIOB4	HDMI_Y0
AG3	GPIOB5	HDMI_Y1
AH6	GPIOB6	HDMI_Y2
AH5	GPIOB7	HDMI_Y3
AG5	GPIOB8	HDMI_Y6
AJ3	GPIOB9	HDMI_HSYNC
AJ2	GPIOB10	SELF_PWR#
AJ1	GPIOB11	CIMAX_RESET
AH4	GPIOB12	P0_HRRMV
AH3	GPIOB13	P1_HRRMV
AH2	GPIOB14	SELF_RST#
AH1	GPIOB15	HDMI_Y7
AG6	GPIOB16	
AH7	GPIOB17	HDMI_VSYNC
AG2	GPIOB18	HDMI_Y4
AG1	GPIOB19	HDMI_Y5
B21	GPIOC0	TUN_SDA
B22	GPIOC1	TUN_SCL
L27	GPIOC2	H_SCDT
L28	GPIOC3	R334 4.7K 0603 EXT_PWRON
L29	GPIOC4	OSD_Y1
B25	GPIOC5	OSD_Y2
H27	GPIOC6	OVERCURRENT
L26	GPIOC7	
H28	GPIOC8	
H29	GPIOC9	
D27	GPIOC10	
C25	GPIOC11	HW_BIT0
C26	GPIOC12	HW_BIT1
B26	GPIOC13	HW_BIT2
B24	GPIOC14	HW_BIT3
B23	GPIOC15	STEP
N28	IRTXD	
N29	IRRXD	
Y5	IDE_DMARQ	
AB1	IDE_IORDY	
AA2	IDE_DD0	
Y4	IDE_DD1	
AA1	IDE_DD2	
W4	IDE_DD3	
Y3	IDE_DD4	
Y2	IDE_DD5	
Y1	IDE_DD6	
V4	IDE_DD7	
W3	IDE_DD8	
W2	IDE_DD9	
W1	IDE_DD10	
U4	IDE_DD11	
V3	IDE_DD12	
U5	IDE_DD13	
V1	IDE_DD14	
V2	IDE_DD15	
U3	IDE_CSb0	
U2	IDE_CSb1	
U1	IDE_DA0	
T3	IDE_DA1	
T2	IDE_DA2	

GPIOA Group
GPIOB Group
GPIOC Group
IR
IDE Interface

X210VC

ATSC3

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150305

xxxx xxx xxxx.x

ATSC4

64MByte Memory Bank using 256Mbit (x 16) components. (wired for larger parts)

The CTSCorp ClearOne DDR SRAM Terminators provide high performance resistor termination as follows:
a.) 25R series resistor provides the series termination for data flow from the DDR SRAM to the X210VC.
b.) 50R resistor provides the Thevenin termination for data flow from the X210VC to the DDR SRAM.
c.) VTT = VDDQ/2

X210VC
633P_BGA

NC Pins

X210VC

Memory Interface

U201D

DQ[31:0]

DDR_2.6V

+2.6V

FB502 0603 MLB-160808-0220P-N2

C501 C502 C503 C504 C505 C506 C507 C508 .1UF 0603

MA[14:0]

U502

K4H561638F-UCCC0000
66P_TSOPII

MA12

DDR_2.6V

RESISTOR ARRAY - RA? -

A side

B side

TOP VIEW

RESISTOR NETWORK TYPE R - RN? -

TOP VIEW

U503

K4H561638F-UCCC0000
66P_TSOPII

MA12

DDR_2.6V

Place close to Xilleon on Memory side

C518 22UF X5R,K 1206

C519 22UF X5R,K 1206

C520 22UF X5R,K 1206

C521 22UF X5R,K 1206

C522 22UF X5R,K 1206

C523 22UF X5R,K 1206

R519 10K 0603

C540 1UF X7R,K 0603

R520 10K 0603

C527 C528 C529 C530 C531 C532 C533 C534 .1UF 0603

C541 C542 C543 C544 C545 C546 C547 C548 .1UF 0603

DDR-SDRAM TERMINATION & REFERENCE VOLTAGE GENERATOR

XXXX XXX XXXX.X

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150305

ATSC5

STBY_3.3V — FB602 MLB-160808-0220P-N2 0603 25% — POD_3.3V

C610 1UF 0603 X5R,K
C611 1UF 0603 X5R,K
C612 1UF 0603 X5R,K
C613 1UF 0603 X5R,K
C614 1UF 0603 X5R,K
C615 1UF 0603 X5R,K

D601 BAT754 — CD1A# — R602 CDET1A# 0 0603 5% — POD_DET#
SOT-23 SCHOTTKY Vr:40V,Ir:0.75A,Vf:0.48V

D602 BAT754 — CD2A# — R603 CDET2A# 0* 0603 5%
SOT-23 SCHOTTKY Vr:40V,Ir:0.75A,Vf:0.48V
DNS

POD card detect
o Active LOW
oTV must be PULL-UP

POD_3.3V — C602 .01UF 0603 X7R,K

POD_DATA[7:0] — U602 74LVC245APW TSSOP 20P
POD_DATA0 POD_DATA1 POD_DATA2 POD_DATA3 POD_DATA4 POD_DATA5 POD_DATA6 POD_DATA7 → FAD0 FAD1 FAD2 FAD3 FAD4 FAD5 FAD6 FAD7 → FAD[15:0]
DATDIR DATOE#

U601 CIMaX SP2L PQFP 128P
VCC_CORE VCC_PROC VCC_TSI VCC_TSO VCC_DVB1 VCC_DVB2
MICLK MISTRT MIVAL MDI7 MDI6 MDI5 MDI4 MDI3 MDI2 MDI1 MDI0
MOCLK MOSTRT MOVAL MDO7 MDO6 MDO5 MDO4 MDO3 MDO2 MDO1 MDO0
RESET CLK SCL SDA SA1 SA0
A25 A24 A23 A22 A21 A20 A19 A18 A17 A16 A15
CS RD/DIR WR/STR WAIT/ACK INT EXTCS EXTINT
DATOE# DATDIR ADOE# ADLE
GND_CORE GND_PROC GND_TSI GND_TSO GND_DVB1 GND_DVB2 NC1 NC2
MICLKA MISTRTA MIVALA MDIA7 MDIA6 MDIA5 MDIA4 MDIA3 MDIA2 MDIA1 MDIA0
MOCLKA MOSTRTA MOVALA MDOA7 MDOA6 MDOA5 MDOA4 MDOA3 MDOA2 MDOA1 MDOA0
RSTA CD1A# CD2A# CE1A# CE2A# RDY/IRQA# WAITA#
REG# OE# WE# IORD# IOWR#
MICLKB MISTRTB MIVALB MDIB7 MDIB6 MDIB5 MDIB4 MDIB3 MDIB2 MDIB1 MDIB0
MOCLKB MOSTRTB MOVALB MDOB7 MDOB6 MDOB5 MDOB4 MDOB3 MDOB2 MDOB1 MDOB0
RSTB CD1B# CD2B# CE1B# CE2B# RDY/IRQB# WAITB#
VCCEN

MPG_CLK MPG_SYNC MPG_DATA_EN MPG_D[7:0] — from X210VC
MPEG_D7 MPEG_D6 MPEG_D5 MPEG_D4 MPEG_D3 MPEG_D2 MPEG_D1 MPEG_D0

TCLKA TSTRTA TVLDA TDATA[7:0] — to X210VC
R620 33 R621 33 R622 33
RP604 33
RP605 33
TDATA7 TDATA6 TDATA5 TDATA4 TDATA3 TDATA2 TDATA1 TDATA0

R601 1K 0603
CIMAX_RESET
CIMAX_27M
R608 0 0603 SCL_A
R609 0 0603 SDA_A
DEVICE ID: 80h

POD_3.3V — R604 10K* 0603 — DNS in a STEP

CS_POD FRD FWE FRDYb INT_POD

to POD Buffer

DATOE# DATDIR ADOE# ADLE

I2C addr : 0x80

INTEL 8bits LOCAL BUS
CIMaX - SIGNAL - X210VC
o RD/DIR - FRD - FRD
o WR/STR - FWE - FWE
o CS - CS_POD - CS_POD
o WAIT/ACK - FRDYb - FRDYb
o Reset Active High

R605 51 0603 1% MOCLK

U603 84648-050H 68P_PCMCIA
MCLKI MISTRT MIVAL MDI7 MDI6 MDI5 MDI4 MDI3 MDI2 MDI1 MDI0
MOCLK/A14 MOSTR CTX/A4 MOVAL ITX/A5 MDO7 ETX/A6 MDO6 QTX/A7 MDO5 CRX/A8 MDO4 DRX/A9 MDO3 MDO2 MDO1 MDO0
REG# CE1# CE2# OE# WE# IORD# IOWR# INPACK# IREQ#
GND1 GND2 GND3 GND4 GND5 GND6 RESET VCC1 VCC2
D0 D1 D2 D3 D4 D5 D6 D7 A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
CD1# CD2# VS1# VS2# WAIT# IOIS16# VPP1 VPP2

POD_DATA0 POD_DATA1 POD_DATA2 POD_DATA3 POD_DATA4 POD_DATA5 POD_DATA6 POD_DATA7
POD_A0 POD_A1 POD_A2 POD_A3 POD_A4 POD_A5 POD_A6 POD_A7 POD_A8 CRX POD_A9 DRX POD_A10 POD_A11 POD_A12 POD_A13
CDET1A# CDET2A# VS1# WAIT# PC_VPP RSTA

R607 10K 5% 0603 — STBY_3.3V
R610 10K 5% 0603 — STBY_3.3V — IRQA#

SOCKET for
"61126-050CAH"
FCI PCMCIA (+3.3V)
CONNECTOR

POD_A[13:0] — U605 74LVC16373ADGG TSSOP 48P
POD_A4 POD_A5 POD_A6 POD_A7 POD_A8 POD_A9 POD_A2 POD_A3 POD_A10 POD_A11 POD_A12 POD_A13
1Q1 1Q2 1Q3 1Q4 1Q5 1Q6 1Q7 1Q8 2Q1 2Q2 2Q3 2Q4 2Q5 2Q6 2Q7 2Q8 1D1 1D2 1D3 1D4 1D5 1D6 1D7 1D8 2D1 2D2 2D3 2D4 2D5 2D6 2D7 2D8
1LE 2LE 1OE 2OE
ADLE ADOE#
LADD4 LADD5 LADD6 LADD7 LADD8 LADD9 LADD2 LADD3 LADD10 LADD11 LADD12 LADD13

U604 74LVC126APW 14P_TSSOP
CRX DRX POD_A0 POD_A1 → FDC_CRX FDC_DRX FBE0 FBE1
1Y 2Y 3Y 4Y 1A 2A 3A 4A 1OE 2OE 3OE 4OE
R619 0 5% — OOB_EN
R606 10K 5% 0603

C616 1UF 0603 X5R,K

OOB enable
o Active High
o X210VC GPIOC4
o OOB_EN: 1=enable
o LADD0 and LADD1 is always enable.

Buffer Control
o When OOB_EN set High, Buffer is disable.
o When ADOE# set High, Buffer is disable.
o When no OOB mode and ADEN# is Low, Address Buffer is enable

LADD[13:2]

C603 .01UF 0603 X7R,K
C604 .01UF 0603 X7R,K
C617 1UF 0603 X5R,K
C618 1UF 0603 X5R,K

LAYOUT NOTE
o closed placement to 74LVC16373ADGG Power Pins

C605 .01UF 0603 X7R,K

U606 SN74LVC1G32GW 5P_DCK
ADOE# OOB_EN → OOB_EN TP50
OR gate

STBY_3.3V
C606 1UF 0603 X5R,K
C607 10UF 1206 X5R,K
POD_5V — FB601 MLB-160808-0120P-N2 0603
C601 1UF 0603 X5R,K
C608 10UF 1206 X5R,K

RP601 10K — STBY_3.3V
RPACK 2X4 5%

R611 10K 5% 0603
R612 10K 5% 0603

U607 TPS2211AIDBR 16P_PSOP
12V 3.3V 3.3V 5V 5V SHDN VCCD0 VCCD1 VPPD0 VPPD1
AVCC AVCC AVCC AVPP OC GND
PC_VPP
C609 .1UF 0603 X5R,K
OVERCURRENT

POD_PS — R624 10K 0603 — Q601 BC847ALT1G SOT23
R613 10K 5% 0603

POD_PS	VCCD1#	VCCD0#	AVCC
0	0	1	+3.3V
1	1	0	+5V

FAD[15:0] — U608 74LVC16373ADGG TSSOP 48P
FAD0 FAD1 FAD2 FAD3 FAD4 FAD5 FAD6 FAD7 FAD8 FAD9 FAD10 FAD11 FAD12 FAD13 FAD14 FAD15
1D1 1D2 1D3 1D4 1D5 1D6 1D7 1D8 2D1 2D2 2D3 2D4 2D5 2D6 2D7 2D8
1Q1 1Q2 1Q3 1Q4 1Q5 1Q6 1Q7 1Q8 2Q1 2Q2 2Q3 2Q4 2Q5 2Q6 2Q7 2Q8
ALE0 — 1LE 2LE 1OE 2OE
LADD2 LADD3 LADD4 LADD5 LADD6 LADD7 LADD8 LADD9 LADD10 LADD11 LADD12 LADD13
LADD[13:2]

C619 .01UF 0603 X7R,K
C620 .01UF 0603 X7R,K
C621 1UF 0603 X5R,K
C622 1UF 0603 X5R,K

U609 VO_27MHZ SCO-103
C623 1UF 0603
R614 100 0603 — CIMAX_27M
C624 5PF 0603

RP602 10K — POD_A2 POD_A3 POD_A5 POD_A6 — RPACK 2X4 5%
RP603 10K — POD_A7 POD_A10 POD_A11 POD_A12 — RPACK 2X4 5%
R617 10K 5% 0603 — POD_A13

R623 10K 5% 0603 — VS1#
R616 100K 5% 0603 — MOCLK

All parts in this page do not stuff in a BASIC model

XXXX XXX XXXX.X

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ATSC6

<2004.12.22-Bryan> For EMC:
1) C1245,C1246,C1255,C1256 Add
2) R727, R728 --> FB1242,FB1243

U701
TD1336OZ
I2C Addres: C2
R732 0* 0603 DNS
R733 0 0603
R1243 75 0603
R1244 0* 0603 DNS at BASIC
R701 2.2K 5% 0603
R702 2.2K 5% 0603
TUNER_5V
FAT power is connected to +5V by the tuner sensitivity.
R1243 is DO NOT STUFF at STEP
IF_AGC
IF_N
IF_P
C1255 100PF 0603
C1256 100PF 0603
C701 1UF 0603
C706 01UF 0603
C739 100PF 0603
C761 10UF 1206
C702 1UF 0603
C710 01UF 0603
C740 100PF 0603
C762 10UF 1206
0.29A,3.4RDC,20% NLFC252018T-3R3M 2520M L701
2520M NLFC252018T-3R3M L703 0.29A,3.4RDC,20%
MLB-160808-0120P-N2 FB1214 0603
C705 1UF 0603
C1254 10UF 1206
C709 1UF 0603
FB1212 0603 MLB-160808-0120A-N2 TUN_SCL
FB1213 0603 MLB-160808-0120A-N2 TUN_SDA
+5V

U703
FDC1332/RV*
I2C Addres: C0
R719 0* 0603
FDC_AGC
FDC_IFN
FDC_IFP
U704
X6965D*
SIP5-SF
B39440X6965N201
DNS in a Basic
C715 1UF* 0603
C716 01UF* 0603
C741 100PF* 0603
C763 10UF* 1206
0.29A,3.4RDC,20% NLFC252018T-3R3M* 2520M L707

2.5V SWITCHING REGULATOR
(~1300mA for Memory chips)
(~200mA Xilleon VDDR1 ?)
(~800mA for SDRAM ClearOne Terminators)
V701
TPS64203DBVR
6P_SOT-23
STB_EN#
R716 0.03 1% 1206
R749 4.7
U702
Si3443DV
6P_TSOP-6
L706 MSCH5750C100M 5750M
FB701 MLB-160808-0220P-N2 0603
+6V
C1260 47UF_10V TANT_B
C711 68UF_10V TANT_C
C707 .1UF 0603
C747 .1UF 0603
C708 .1UF 0603
2.6V@1.5A
1.5A
+2.6V
C712 47UF_6.3V TANT_B 20%
C760 47UF_6.3V TANT_B 20%
R717 294K 1% 0603
C713 5pF 0603 NPO,J
D702 MBR120LSFT1 SOD-123FL
R718 261K 1% 0603
This switcher is set to a preset value of 2.584V

L704 MSCH5750C100M 5750M
+6V
C746 .1UF 0603
C1261 47UF_10V TANT_B
C1262 47UF_10V TANT_B
C717 470UF_10V 8X11.5
C718 .1UF 0603
C742 1UF 0603
C743 01UF 0603
C744 01UF 0603
C745 1000PF 0603
R746 2.2
R747 2.2
Q701A
Q701B
FDS6912A
SO-8
V702
LM2737MTCX
14P_TSSOP
STB_EN
C723 .033UF 0603
R711 150K
R712 1.5K
C724 4.7PF 0603
R714 1000PF 1%
C725 229K 0603
C726 .1UF 0603
FB702 MLB-160808-0220P-N2 0603
C1263 47UF_10V TANT_B
C719 2.2UF 1206
FB1215 MLB-160808-0220P-N2 0603
C1264 47UF_10V TANT_B
D701 BAT754 SOT-23
L705 MSCH5750C100M 5750M
+1.1V
C737 1000PF 0603
R721 10K 0603
C752 1000PF 0603
C720 220UF_4V TANT_C
C703 220UF_4V TANT_C
C721 1000PF 0603
C722 .1UF 0603
R713 5.1K 1%
R715 6.04K 1% 0603

U705 NOR GATE
SN74LVC1G02
5P_DCK
STB_EN#
SELF_PWR#
R723 10K 0603
PWR_ON
R722 1K 0603
C756 .1UF 0603
R736 10K 0603
R1245 10K* 0603
Q703 BC847ALT1G SOT23
EXT_PWRON
DNS : R1245
R735 1K 0603
PWR_ON#5
PWR_ON R739 10K 0603
Q706 BC847ALT1G SOT23

U706
STB_EN# R741 47K 0603
PWR_ON#5 R742 47K 0603
C748 .1UF 0603
C749 .1UF 0603
STBY_3.3V
AN_3.3V
R703 10K 0603
R704 10K 0603
SI4931DY-T1-E3
SO-8

V707
EZ1117ACST
SOT-223 1A
C1265 47UF_10V TANT_B
C728 100UF_16V 5X11
C730 .1UF 0603
R725 100 1% 0603
R726 44.2 1% 0603
R1
R2
C727 100UF_16V 5X11
C729 .1UF 0603
1.8V@400mA
Vout = Vref(1 + (R2/R1)) + Iadj*R2
Vref=1.25V, Iadj=50uA
Vout = 1.25V(1+0.44) = 1.8 Volt

V703
TPS64203DBVR
6P_SOT-23
R730 0.03 1% 1206
R750 4.7
U709
Si3443DV
6P_TSOP-6
L708 MSCD75-120K 7X7.8X5
L702 MSCH5750C100M 5750M
C732 .1UF 0603
C1266 47UF_10V TANT_B
C1267 47UF_10V TANT_B
C753 470UF_10V 8X11.5
C731 .1UF 0603
C714 .1UF 0603
+3.3V
1.5A
+1.5V
C757 220UF_4V TANT_C
C754 68UF_4V TANT_B 20%
R731 2.37K 1% 0603
C755 5pF 0603 NPO,J
R748 10K 1% 0603
D707 MBR120LSFT1 SOD-123FL
This switcher is set to a preset value of 1.5V
1.5V@1.5A
PWR_ON#5 R743 47K 0603
PWR_ON#5 R744 47K 0603
U707
SI4931DY-T1-E3
SO-8
+1.8V
AN_5V
HDMI_1.8V
C750 .1UF 0603
C751 .1UF 0603
R705 10K 0603
R706 10K 0603

+10V
V704
LM2941S*
TO-263
PWR_ON#5
R734 6.04K* 0603
+9V
C733 100UF_16V* 5X11
C734 100UF_16V* 5X11
R710 1K* 0603
9V@100mA

D703 BAV99LT1G SOT-23
D704 BAV99LT1G SOT-23
STBY_3.3V
R729 0 5%
+1.8V

V705
LM2941S
TO-263
+6V
C735 10UF X5R,K 1206
STB_EN#
R707 2.94K 0603
R708 1K 0603
C736 10UF X5R,K 1206
C704 .1UF 0603
C738 .1UF 0603
5V@0.9A
+5V
POD_5V

XXXX XXX XXXX.X
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ATSC7

RXAC-
RXAC+
RV801 CT0402S14AHSG* 0402
RV802 CT0402S14AHSG* 0402
RXA0-
RXA0+
RV805 CT0402S14AHSG* 0402
RV806 CT0402S14AHSG* 0402
RXA1-
RXA1+
RV809 CT0402S14AHSG* 0402
RV810 CT0402S14AHSG* 0402
RXA2-
RXA2+
RV813 CT0402S14AHSG* 0402
RV814 CT0402S14AHSG* 0402
DNS

HAN_3.3V
C803 1000PF 0603
C804 1000PF 0603
C805 1UF 0603
C806 1UF 0603

HPLL_3.3V
C812 1UF 0603
C813 1000PF 0603

HDAN_5V0
C801 .1UF 0603
U801
CAT24FC02 SO8
R801 4.7K 0603
R802 4.7K 0603
HDMI_3.3V
Q801 BSN20 SOT-23
R803 470K 0603
R804 470K 0603
DSCL0
DSDA0
R805 100 0603
Q802 BSN20 SOT-23
HSCLA
HSDAA
R806 100 0603

XTAL_3.3V
C819 1UF 0603
XREG_3.3V
C820 1UF 0603

HDMI_3.3V
C821 1000PF 0603
C822 1UF 0603
C823 1UF 0603
C826 1UF 0603
C837 1UF 0603
C838 1UF 0603
C839 1UF 0603
C840 1UF 0603

HDAN_5V0
R830 4.7K 0603
WP1
WP1 TP73

HDMI_3.3V
HDMI_5V0
Q805 2N7002 SOT-23
R809 4.7K 0603
C828 01UF 0603
R0PWR5V

H_1.8V
C830 1000PF 0603
C815 1UF 0603
C832 1UF 0603
C833 1UF 0603
C834 1UF 0603
C835 1UF 0603
C836 1UF 0603

TEST R826 4.7K 0603

H_1.8V
C842 1UF 0603

U803
Sil 9011
128-Pin LQFP

	48	ANTSTO	
RXAC-	50	RXC-	
RXAC+	51	RXC+	
RXA0-	54	RX0-	
RXA0+	55	RX0+	
RXA1-	58	RX1-	
RXA1+	59	RX1+	
RXA2-	62	RX2-	
RXA2+	63	RX2+	
HAN_3.3V	49	AVCC	
	53	AVCC	
	57	AVCC	
	61	AVCC	
	52	AGND	
	56	AGND	
	60	AGND	
	64	AGND	
HPLL_3.3V	47	PVCC	
	46	PGND	
H_1.8V	66	DVCC	
	82	DVCC2	
	65	DGND	
	83	DGND2	
XTAL_3.3V	86	XTALVCC	
XREG_3.3V	87	REGVCC	
HDMI_1.8V	45	VPP	
CI2CA	38	CI2CA	
TP71 RMUTE	67	MUTE	
	70	SPDIF	
	71	SD3	
	72	SD2	
	73	SD1	
RSD0	74	SD0	
RWS	75	WS	
RSCK	76	SCK	
TP56 MCLK	79	MCLK	
RXO	84	XTALOUT	
RXI	85	XTALIN	
R0PWR5V	44	PWR5V	
H_1.8V	12	VCC	
	24	VCC	
	36	VCC	
	81	VCC	
	112	VCC	
	125	VCC	
	13	GND	
	25	GND	
	37	GND	
	80	GND	
	113	GND	
	126	GND	
TEST	43	NC	
	88	TEST	
UC_SCL	40	CSCL	
UC_SDA	39	CSDA	
	118	OGND	
	106	OGND	
	97	OGND	
	78	OGND	
	69	OGND	
	129	GND_PAD	
	130	GND_PAD	
	131	GND_PAD	
	132	GND_PAD	
	133	GND_PAD	
	134	GND_PAD	
	135	GND_PAD	

DE	127	RDE	RDE
VSYNC	1	RVSYNC	RVSYNC
HSYNC	128	RHSYNC	RHSYNC
ODCK	119	RODCK	RODCK
	35	QO0	
	34	QO1	
	33	QO2	
	32	QO3	
	29	QO4	
	28	QO5	
	27	QO6	
	26	QO7	
	23	QO8	
	22	QO9	
	21	QO10	
	20	QO11	
	17	QO12	
	16	QO13	
	15	QO14	
	14	QO15	
	11	QO16	
	10	QO17	
	9	QO18	
	8	QO19	
	5	QO20	
	4	QO21	
	3	QO22	
	2	QO23	
	124	QE0	
	123	QE1	
	122	QE2	
	121	QE3	
	117	QE4	
	116	QE5	
	115	QE6	
	114	QE7	
QE8	111	RDE8	RDE[15:8]
QE9	110	RDE9	
QE10	109	RDE10	
QE11	108	RDE11	
QE12	105	RDE12	
QE13	104	RDE13	
QE14	103	RDE14	
QE15	102	RDE15	
QE16	101	VPA4	VPA[11:4]
QE17	100	VPA5	
QE18	99	VPA6	
QE19	96	VPA7	
QE20	95	VPA8	
QE21	94	VPA9	
QE22	93	VPA10	
QE23	92	VPA11	
DSCL	42	DSCL0	
DSDA	41	DSDA0	
RESET#	89	RX_RST#	
SCDT	90	RX_SCDT	
INT	91	RX_INT	
OVCC	7		HDMI_3.3V
OVCC	19		
OVCC	31		
OVCC	68		
OVCC	77		
OVCC	98		
OVCC	107		
OVCC	120		
	6	OGND	
	18	OGND	
	30	OGND	
	144	GND_PAD	
	143	GND_PAD	
	142	GND_PAD	
	141	GND_PAD	
	140	GND_PAD	
	139	GND_PAD	
	138	GND_PAD	
	137	GND_PAD	
	136	GND_PAD	

Sil 9011
LQFP_128P

I2C address
First device: 0x60
Second device: 0x68

AN_3.3V
FB801 0603 MLB-160808-0120P-N2
HPLL_3.3V
FB802 0603 MLB-160808-0120P-N2
HDMI_3.3V
FB803 0603 MLB-160808-0120P-N2
HAN_3.3V
FB804 0603 MLB-160808-0120P-N2
XTAL_3.3V
FB805 0603 MLB-160808-0120P-N2
XREG_3.3V

HDMI_1.8V
FB806 0603 MLB-160808-0120P-N2
C807 1UF 0603
H_1.8V
C802 10UF 1206

RVSYNC
RHSYNC
RDE
RODCK
R827 0 0603
R801 33
HDMI_VSYNC
HDMI_HSYNC
HDMI_DE
HDMI_P_CLK
C845 5PF 0603

RSD0 R813 33 0603 I2SSD_IND
RWS R814 33 0603 I2SWS_IND
RSCK R816 33 0603 I2SSCK_IND

HSCLA
HSDAA
RV817 CT0402S14AHSG* 0402
RV818 CT0402S14AHSG* 0402
DNS

RP802 33
RDE15 RDE14 RDE13 RDE12 RDE11 RDE10 RDE9 RDE8
HDMI_Y7 HDMI_Y6 HDMI_Y5 HDMI_Y4 HDMI_Y3 HDMI_Y2 HDMI_Y1 HDMI_Y0
HDMI_Y[7:0]
RP803 33

RP804 33
VPA8 VPA9 VPA10 VPA11 VPA4 VPA5 VPA6 VPA7
HDMI_CbCr4 HDMI_CbCr5 HDMI_CbCr6 HDMI_CbCr7 HDMI_CbCr0 HDMI_CbCr1 HDMI_CbCr2 HDMI_CbCr3
RP805 33

AVIO_3.3V
HDMI_CbCr2 HDMI_CbCr3 HDMI_CbCr6 HDMI_CbCr7
RP806 10K

UC_SDA R811 0 0603 SDA_B
UC_SCL R812 0 0603 SCL_B
RX_RST# HDMI_PD
R815 10K 0603

RX_INT R819 0 0603 HDMI_INT
RX_SCDT R820 0 0603 H_SCDT
CI2CA R822 10K 0603

<2004.12.20-Bryan> For EMC:
RP801,RP802,RP803,RP804,RP805 : Close to X210VC as possible

C843 18PF 0603
C844 18PF 0603
R828 1M 0603
Y801 28.322MHz ATS-49/U +/-20PPM
R829 100 0603
RXO
RXI

XXXX XXX XXXX.X

F_15060_025.eps
150305

ATSC8

Blend Ratio
OSD_V2 OSD_Y1 INT : OSD
L L 10:0
H L 7:3
L H 5:5
H H 0:10

Test purpose resistors

U901
TA1360AFG
80P_QFP

Inductor Selection Guide
As regarding voltage drop, the maximum resistance value of inductor can be used 3.09ohm

<2004.12.24> Do not Stuff all components of outside BLACK Box in MP

From SOC(MPEG-2 Decoder)

<2004.12.20> Yap :
L901,L902,L903 0.47uH
==> 0 Ohm in MP

Input level: 0.7Vp-p 100IRE

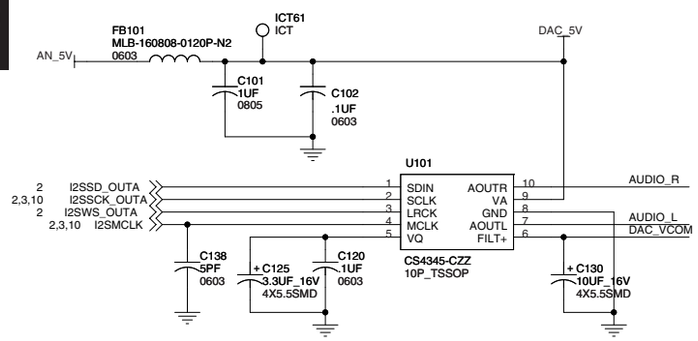
U902
TA1317AFG
30P_SSOP

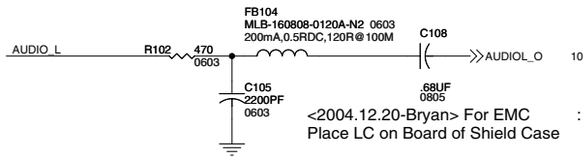
MLB-160808-0220P-N2
FB904
0603

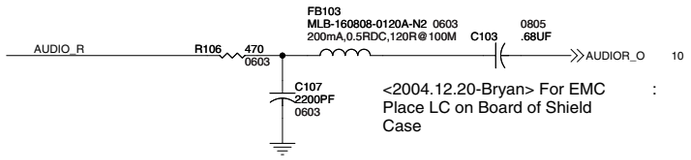
XXXX XXX XXXX.X

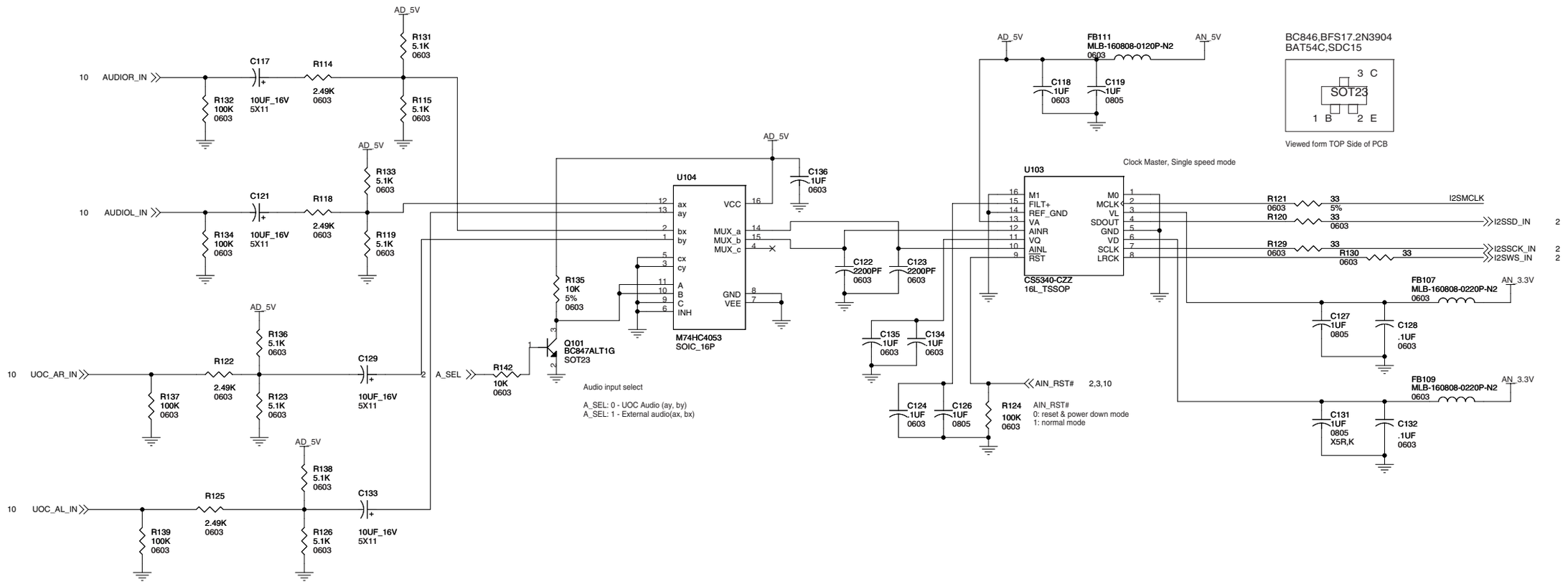
F_15060_026.eps
150305

ATSC9









XXXX XXX XXXX.X

F_15060_027.eps
150305

ATSC10

In mass Production, P1255 will be changed to 6-Pin connector, and 6-pin connector description will be found in PARTLIST.

F_Y R21 0 0603 DEF_OP_1
F_Pb R22 0 0603 DEF_OP_2
F_Pr R23 0 0603 DEF_OP_3
R24 0 0603 DEF_OP_4
R25 0 0603 DEF_OP_5
F_R R26 0* 0603 DEF_OP_6
F_G R27 0* 0603 DEF_OP_7
F_B R28 0* 0603 DEF_OP_8
HSYNC_DEC R31 0* 0603 DEF_OP_9
VSYNC_DEC R30 0* 0603 ES_2
DNS

Vguard R34 0* 0603 DEF_OP_1
EHTinfo R35 0* 0603 DEF_OP_2
VDRA R36 0* 0603 DEF_OP_3
VDRB R37 0* 0603 DEF_OP_4
EW_drive R38 0* 0603 DEF_OP_5
SVM_ROT R39 0* 0603 DEF_OP_6
HFB R40 0* 0603 DEF_OP_7
H_DRV R41 0* 0603 DEF_OP_8
R29 0* 0603 DEF_OP_9
ES_2 ES_1
C13 5PF* 0603, C12 5PF* 0603, C11 5PF* 0603, C10 5PF* 0603, C9 5PF* 0603, C8 5PF 0603, C6 5PF 0603, C4 5PF 0603
DNS

P1255
1 Vguard
2 EHTinfo
3 VDRA
4 VDRB
5 EW_drive
6 GND
7 SVM_ROT
8 HFB
9 HD
10 EW_FD
11 X 1 CONNECTOR
11P_2.5_THRUHOLE
S6B-EH-A

<2004.12.20-Bryan> For EMC, 5pF(DNS) -> 100pF

R_CRT
G_CRT
B_CRT
BC_INFO
C1253 100PF 0603, C1242 100PF 0603, C1243 100PF 0603, C1244 100PF 0603
P1340
1 R
2 G
3 B
4 GND
5 BC_INFO
5X1 CONNECTOR*
5P_2_THRUHOLE
B5B-PH-K-S
CRT amp
DNS

<2004.12.20-Bryan> For EMC

STBY_3.3V
R16 10K 5%

<2004.12.20-Bryan> For EMC:
1) C1245,C1246,C1257,C1258,C1259 Add
2) R11, R12 --> FB1207,FB1208
3) FB1209,FB1210,FB1211 Add

UOC_TX FB1207 0603 MLB-160808-0120A-N2
UOC_RX FB1208 0603 MLB-160808-0120A-N2
POD_DET# FB1209 0603 MLB-160808-0120A-N2
EXT_PWRON FB1210 0603 MLB-160808-0120A-N2
RESET# FB1211 0603 MLB-160808-0120A-N2
P1206
1 Tx
2 Gnd
3 Rx
4 Bus request
5 Power on
6 Reset#
6 X 1 CONNECTOR
6P_2_THRUHOLE
B6B-PH-K-S
1206

C1257 100PF 0603, C1258 100PF 0603, C1259 100PF 0603, C1245 5PF 0603, C1246 5PF 0603
RV1 0402 CT0402S14AHSG
RV2 0402 CT0402S14AHSG
R10 10K 0603 5%

EXT_3.3V
DNS
R1 10K* 0603
R2 10K* 0603
UOC_SDA R32 100* 0603
UOC_SCL R33 100* 0603
P1257
1 SDA
2 SCL
3 GND
3 X 1 CONNECTOR*
3P_2.5_THRUHOLE
B3B-EH-A
1005

<2004.12.20-Bryan> For EMC
: C1247,C1248
C1247 100PF 0603, C1248 100PF 0603

+3.3V MLB-160808-0120P-N2 FB1216 0603
+10V MLB-160808-0120P-N2 FB1217 0603
+6V
EXT_3.3V
FB1 MLB-451616-0050P-N1 4516M
FB2 MLB-451616-0050P-N1* 4516M
FB3 MLB-451616-0050P-N1 4516M
P1533
1 3.3V
2 3.3V
3 Vaux_GND
4 Vaux_GND
5 +10VA (9.8~11)
6 Vaux_GND1
7 POWER_DOWN
8 stby_en
9 Vaux_GND1
10 +6VA (5.5~6)
11 +6VA (5.5~6)
12 Vaux_GND
12X1 CONNECTOR
B12B-PH-K-S
12P_2_THRUHOLE
1533
C1272 1UF 0603
C1273 1UF 0603
C1268 1UF 0603
C1 470UF_16V 8X11.5
C2 470UF_16V 8X11.5
C3 470UF_16V 8X11.5

FB7 MLB-451616-0050P-N1 4516M
FB8 MLB-160808-0120P-N2 0603
P1534
1 3.3V
2 3.3V
3 3.3V
4 GND
5 GND
6 GND
7 6V
8 GND
8 X 1 CONNECTOR
8P_2_THRUHOLE
B8B-PH-K-S
New connector
C1271 1UF 0603
C1269 68UF_10V TANT_C
C1274 1UF 0603
C1270 68UF_10V TANT_C

HDMI_5V0
HDMI_3.3V
RXA2+ L1, RXA2- RXA1+ L2, RXA1- RXA0+ L3, RXA0- RXAC+ L4, RXAC-
ACM2012D-900-2P 4P_2012M
R8 47K* 0603 DNS
HSCLA HSDAA
MLB-160808-0120P-N2 FB1223 0603
P0_HRRMV
R6 1K 0603
R7 20K 0603
Q1 2N7002 SOT-23
P8
SH1 SH2
HDMI CONNECTOR
19P_DIP
DC1R019N-F
JAE
TMDS DATA2+
TMDS DATA2 SHIELD
TMDS DATA2-
TMDS DATA1+
TMDS DATA1 SHIELD
TMDS DATA1-
TMDS DATA0+
TMDS DATA0 SHIELD
TMDS DATA0-
TMDS CLOCK+
TMDS CLOCK SHIELD
TMDS CLOCK-
CEC
RESERVED
SCL
SDA
DDC/CEC Ground
+5V power
Hot Plug Detect

HDMI_5V1
HDMI_3.3V
RXB2+ L5, RXB2- RXB1+ L6, RXB1- RXB0+ L7, RXB0- RXBC+ L8, RXBC-
ACM2012D-900-2P* 4P_2012M
R9 47K* 0603
HSCLB HSDAB
P1_HRRMV
Q2 2N7002* SOT-23
R17 1K* 0603
R18 20K 0603
DNS
P11
SH1 SH2
HDMI CONNECTOR*
19P_DIP
DC1R019N-F
JAE
TMDS DATA2+
TMDS DATA2 SHIELD
TMDS DATA2-
TMDS DATA1+
TMDS DATA1 SHIELD
TMDS DATA1-
TMDS DATA0+
TMDS DATA0 SHIELD
TMDS DATA0-
TMDS CLOCK+
TMDS CLOCK SHIELD
TMDS CLOCK-
CEC
RESERVED
SCL
SDA
DDC/CEC Ground
+5V power
Hot Plug Detect

P1254
UOC_R MLB-160808-0120A-N2 FB11 0603
UOC_G MLB-160808-0120A-N2 FB10 0603
UOC_B MLB-160808-0120A-N2 0603 FB9
HS_IN R19 22 0603
VS_IN R20 22 0603
C14 5PF 0603, C15 5PF 0603
1 GND
2 R of analog video
3 GND
4 G of analog video
5 GND
6 B of analog video
7 H sync(Composite sync)
8 V sync
8 X 1 CONNECTOR
8P_2.5_THRUHOLE
B8B-EH-A
1250

AN_5V D1 BAT754 SOT-23 HDAN_5V0
HDMI_5V0 D2 BAT754 SOT-23
AN_5V D3 BAT754* SOT-23 HDAN_5V1
HDMI_5V1 D4 BAT754* SOT-23

STBY_3.3V
R15 10K 5%
PC_TXD MLB-160808-0120A-N2 FB1205 0603 25%
PC_RXD FB1206 0603 25%
MLB-160808-0120A-N2
C1251 100PF 0603, C1252 100PF 0603
RV3 CT0402S14AHSG 0402
RV4 0402 CT0402S14AHSG
P13
1 Tx
2 GND
3 Rx
S3B-PH-K-S
3P_2_THRUHOLE

<2004.12.20-Bryan> For EMC:
1) C1251,C1252 Add
2) R13, R14 -->FB1205, FB1206

STBY_3.3V
P1101
1 P_CON*
Note: It cannot directly hook it up with PC serial port without the transceiver

MLB-160808-0120A-N2 FB4 0603
MLB-160808-0120A-N2 FB5 0603
MLB-160808-0120A-N2 FB106 0603 25%
MLB-160808-0120A-N2 FB105 0603 25%
MLB-160808-0120A-N2 FB6 0603
EXT_Y
SPDIF
EXT_Pb
AUDIOL_IN
AUDIOR_IN
EXT_Pr
RV104 CT0402S14AHSG 0402
P15
A B C D E F
DWRS-609B
9P_8.2_RCA
RV5 CT0402S14AHSG 0402
RV6 CT0402S14AHSG 0402
RV7 CT0402S14AHSG 0402
RV103 CT0402S14AHSG 0402
Color
Red White Orange
Red Blue Green
Position
A/R A/L SPDIF
Pr Pb Y

AUDIOR_O
AUDIOL_O
P1219
1 R audio of ATSC
2 GND
3 L audio of ATSC
4 GND
4 X 1 CONNECTOR
4P_2_THRUHOLE
B4B-PH-K-S
1219

P1546
1 X 1 CONNECTOR
SL_THRUHOLE
0-10645-1
SPADE LUG
AMP

UOC_AR_IN MLB-160808-0120A-N2 FB112 0603 25%
UOC_AL_IN MLB-160808-0120A-N2 FB113 0603 25%
C16 5PF 0603, C17 5PF 0603
P1208
1 R audio o/p of analog source
2 L audio o/p of analog source
3 GND
3 X 1 CONNECTOR
3P_2_THRUHOLE
B3B-PH-KL
1208

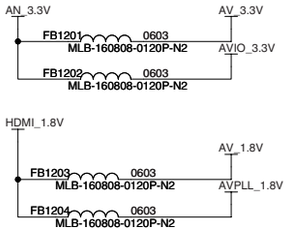
<2004.12.20-Bryan> For EMC
1) C16,C17 --> Stuff
2) R42, R43 --> FB112, FB113
3) RV105, RV106 --> Change location

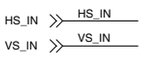
TH1 TH2 TH3 TH4
GND1 GND2 GND3 GND4 GND5 GND6 GND7 GND8
SHIELD_HOLE 0.5pie x8

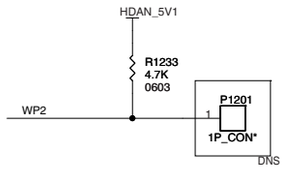
XXXX XXX XXXX.X

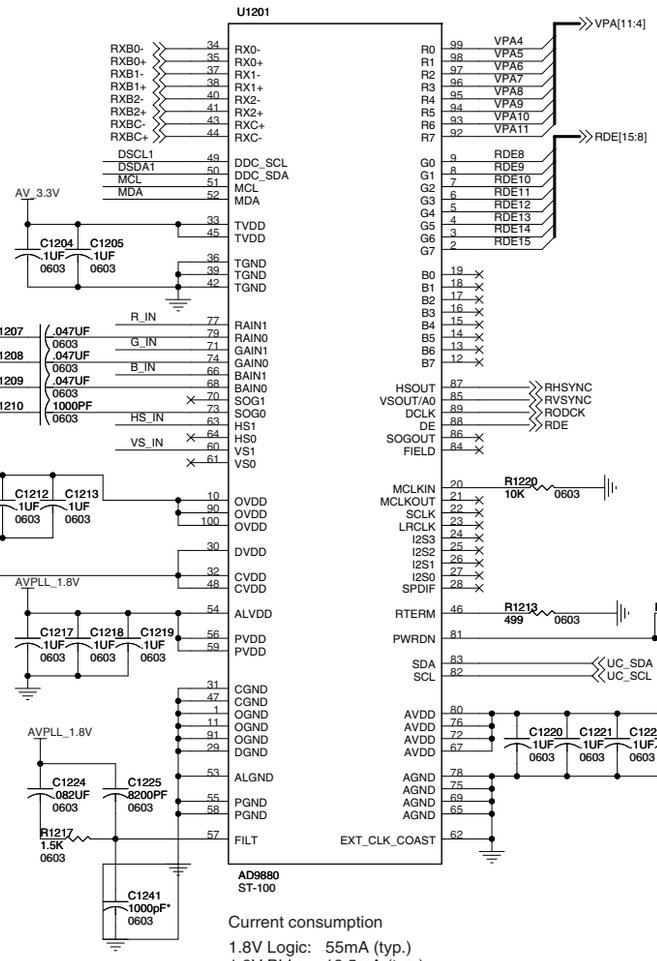
F_15060_028.eps
150305

ATSC11



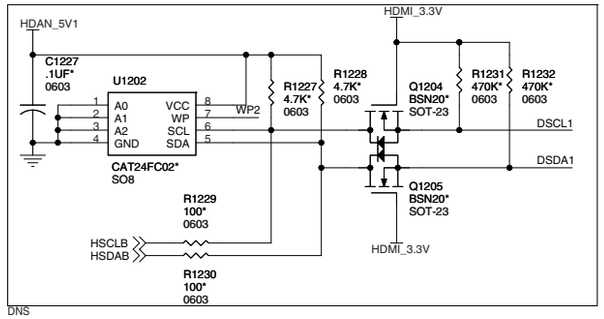


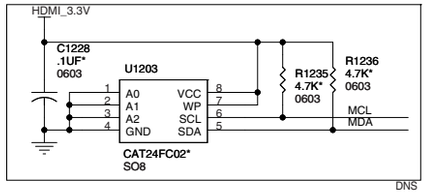


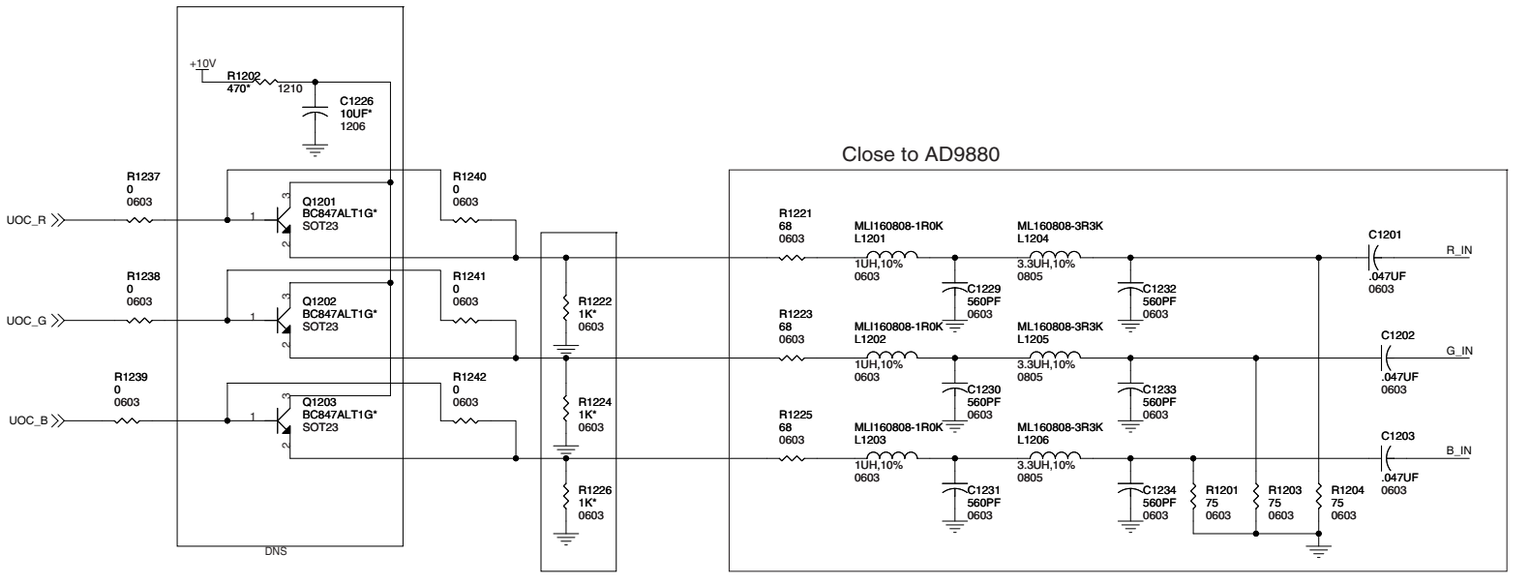


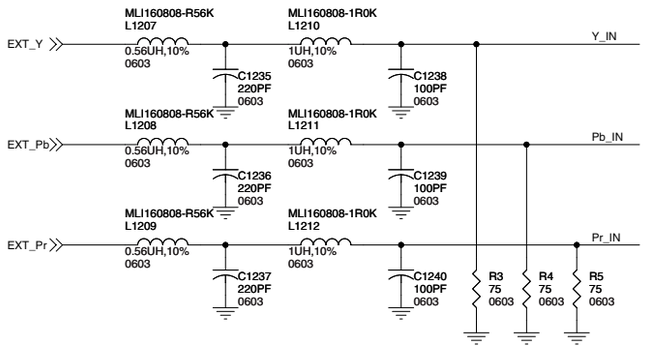
Current consumption

1.8V Logic: 55mA (typ.)
1.8V PLL: 13.5mA (typ.)
3.3V analog: 325mA (typ.)
3.3V Output: 33mA (typ.)









8. Alignments

Index of this chapter:

8.1 General Alignment Conditions
8.2 Hardware Alignments
8.3 Software Alignments and Settings

Note:

- The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5 “Service Modes, ...”.
- Menu navigation is done with the CURSOR UP, DOWN, LEFT, or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- AC voltage and frequency (region dependent):
  - 120 V_ac / 60 Hz, or
  - 240 V_ac / 50 Hz.
- Connect the set to the AC power (a.k.a. Mains voltage) via an isolation transformer with a low internal resistance.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: Ri > 10 Mohm; Ci < 2.5 pF.
- Use an isolated trimmer / screwdriver to perform the alignments.

8.2 Hardware Alignments

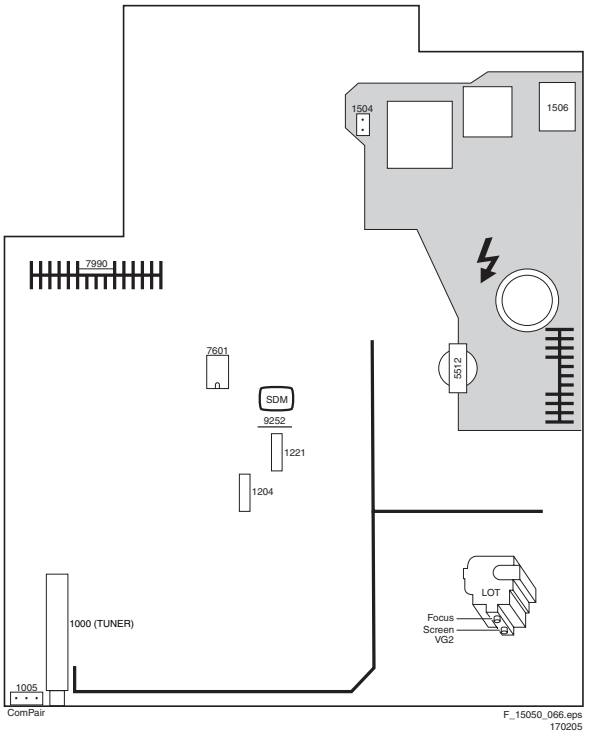


Figure 8-1 Top view family board

8.2.1 Vg2 Adjustment

1. Activate the SAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to “32”.
4. Go, via the MENU key, to the normal user menu and set
5. SATURATION/COLOR to “0”.
6. CONTRAST to “0”.
7. BRIGHTNESS to minimum (OSD just visible).
8. Return to the SAM via the MENU key.
9. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT without any OSD info) with a signal strength of 1 V_pp.
10. Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse). Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket.
11. Measure the cut off pulse during first full line after the frame blanking (see figure “V_cutoff waveform”). You will see two pulses, one being the “cut off” pulse and the other being the “white drive” pulse. Choose the one with the lowest value; this is the “cut off” pulse.
12. Select the cathode with the highest V_dc value for the alignment. Adjust the V_cutoff of this gun with the SCREEN potentiometer (see figure “Top view family board”) on the LOT to 160 V_dc, except for the 25/28BLD picture tube (Black Line Display, for EU only); this tube must be aligned to 140 V_dc.
13. Restore BRIGHTNESS and CONTRAST to normal (= 31).

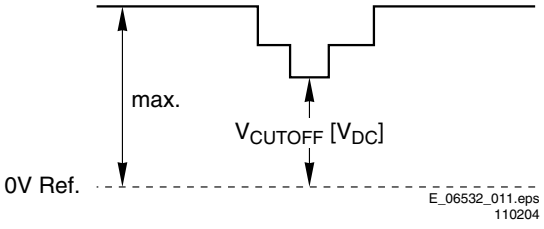


Figure 8-2 V_cutoff waveform

8.2.2 Focusing

1. Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
2. Choose picture mode NATURAL with the SMART PICTURE button on the remote control transmitter.
3. Adjust the FOCUS potentiometer (see figure “Top view family board”) until the vertical lines at 2/3 from east and west, at the height of the centerline, are of minimum width without visible haze.

8.3 Software Alignments and Settings

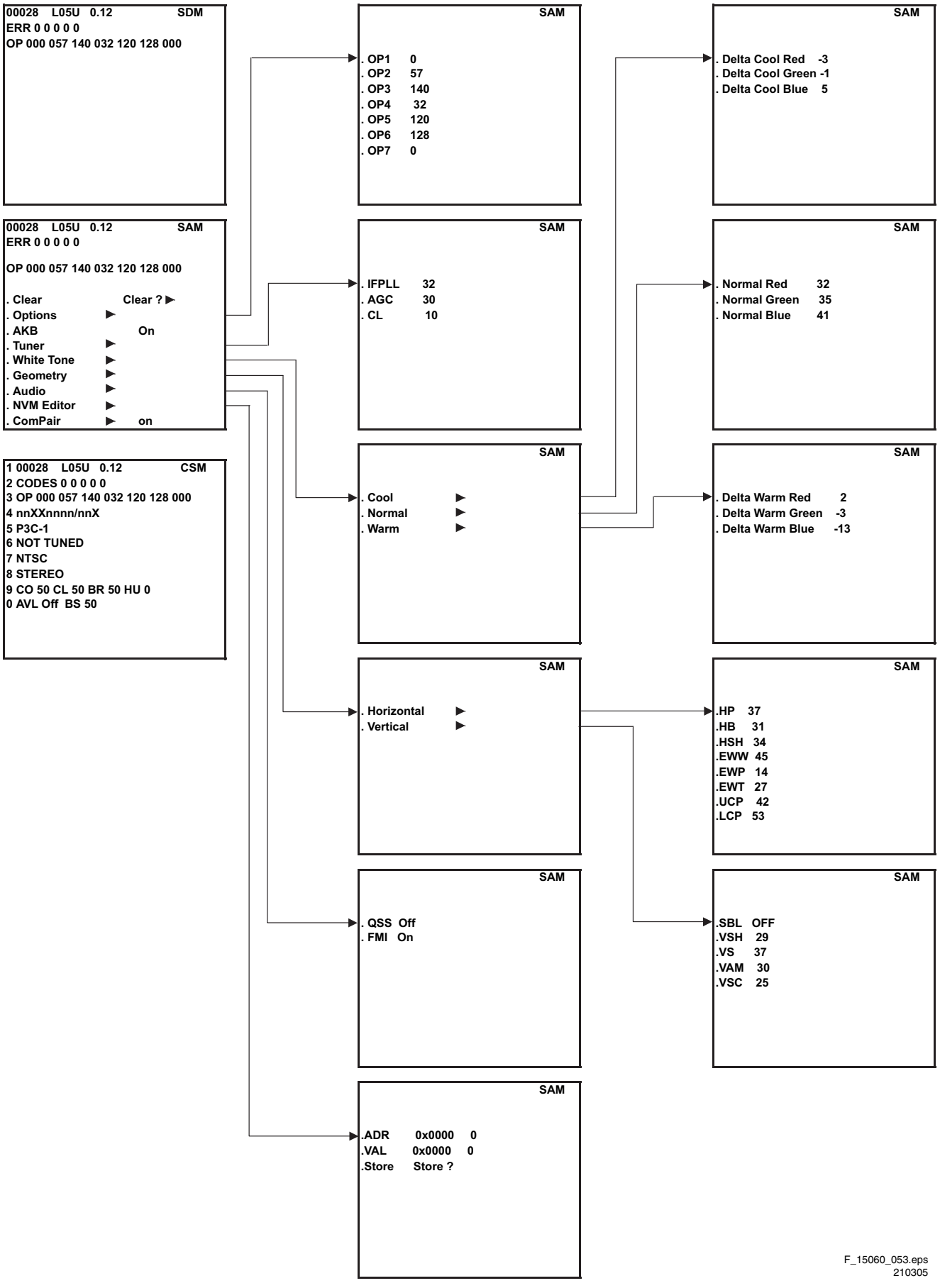


Figure 8-3 Service Mode overview

Enter the Service Alignment Mode (see also chapter 5 “Service Modes, ...”). The SAM menu will now appear on the screen. Select one of the following alignments:

- Options
- Tuner
- White Tone
- Geometry
- Audio

8.3.1 Options

Options are used to control the presence/absence of certain features and hardware.

How to change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly, makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OP1.. OP7) with the MENU UP/ DOWN keys, and enter the new value.

Leaving the OPTION submenu saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched “off” and “on” with the AC power switch (cold start).

How to calculate the value of an Option Byte

- Calculate an Option Byte value (OP1 .. OP7) in the following way:
- Check the status of the single option bits (OB): are they enabled (1) or disabled (0).
- When an option bit is enabled (1) it represents a certain value (see column “Bit value” in table below). When an option bit is disabled, its value is 0.
- The total value of an Option Byte (decimal) is formed by the sum of its eight option bits. The factory values are printed on a sticker on the CRT (depends on region).

Table 8-1 Option Byte calculation

Bit (value)	OP1	OP2	OP3	OP4	OP5	OP6	OP7
0 (1)	OB10	OB20	OB30	OB40	OB50	OB60	OB70
1 (2)	OB11	OB21	OB31	OB41	OB51	OB61	OB71
2 (4)	OB12	OB22	OB32	OB42	OB52	OB62	OB72
3 (8)	OB13	OB23	OB33	OB43	OB53	OB63	OB73
4 (16)	OB14	OB24	OB34	OB44	OB54	OB64	OB74
5 (32)	OB15	OB25	OB35	OB45	OB55	OB65	OB75
6 (64)	OB16	OB26	OB36	OB46	OB56	OB66	OB76
7 (128)	OB17	OB27	OB37	OB47	OB57	OB67	OB77
Total:	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Option Bit Assignment

Following are the option bit assignments for all software clusters.

Table 8-2 Option code overview per model (OP0 - OP5)

Option Bit	Option Name	26PW21718	30PW21709	27PT21714	32PT21705
OP0					
7	Philips Tuner	1	1	1	1
6	Not Used	0	0	0	0
5	Not Used	0	0	0	0
4	Not Used	0	0	0	0
3	Not Used	0	0	0	0
2	Not Used	0	0	0	0
1	Not Used	0	0	0	0
0	Not Used	0	0	0	0
	OP1 value (dec)	128	128	128	128
	OP1 value (hex)	80	80	80	80
OP1					
7	Not Used	0	0	0	0
6	Green_UI	0	0	0	0
5	Not Used	0	0	0	0
4	Not Used	0	0	0	0
3	Tilt	1	1	0	1
2	Fine_Tuning	0	0	0	0
1	Not Used	0	0	0	0
0	Not Used	0	0	0	0
	OP2 value (dec)	8	8	0	8
	OP2 value (hex)	08	08	00	08
OP2					
7	Not Used	0	0	0	0
6	ATI_PIP	1	1	1	1
5	Not Used	0	0	0	0
4	Not Used	0	0	0	0
3	Virtual Dolby	1	1	1	1
2	Wide Screen	1	1	0	0
1	Not Used	0	0	0	0
0	Not Used	0	0	0	0
	OP3 value (dec)	76	76	72	72
	OP3 value (hex)	4C	4C	48	48
OP3	Not Used				
	OP4 value (dec)	0	0	0	0
	OP4 value (hex)	00	00	00	00
OP4					
7	AV1	1	1	1	1
6	AV2	1	1	1	1
5	AV3	1	1	1	1
4	CVI	1	1	1	1
3	SVHS2	1	1	1	1
2	SVHS3	1	1	1	1
1	HDMI	1	1	1	1
0	YPbPr	1	1	1	1
	OP5 value (dec)	255	255	255	255
	OP5 value (hex)	FF	FF	FF	FF
OP5					
7	QUADRA_SURF	0	0	0	0
6	SMART_SURF	0	0	0	0
5	Not Used	0	0	0	0
4	Comb filter	1	1	1	1
3	Active control	1	1	1	1
2	Not Used	0	0	0	0
1	Not Used	0	0	0	0
0	Not Used	0	0	0	0
	OP6 value (dec)	24	24	24	24
	OP6 value (hex)	18	18	18	18

Table 8-3 Option code overview per model (OP6)

Option Bit	Option Name	26PW21718	30PW21709	27PT21714	32PT21705
OP6					
7	Not Used	0	0	0	0
6	Not Used	0	0	0	0
5	Not Used	0	0	0	0
4	Not Used	0	0	0	0
3	Digital_Module_Reset_Control	1	1	1	1
2	Not Used	0	0	0	0
1	Not Used	0	0	0	0
0	Not Used	0	0	0	0
	OP7 value (dec)	0	0	0	0

Option bit definition

Option Byte 1 (OP1)
- **OB17**: PHILIPS TUNER
  - 0 : ALPS / MASCO compatible tuner is in use.
  - 1 : Philips compatible tuner is in use.

Option Byte 2 (OP2)
- **OB26**: GREEN UI
  - 0 : Green UI is disabled (for Philips brand).
  - 1 : Green UI is enabled (for Magnavox brand).
  - Note: only for NAFTA region.
- **OB23**: TILT
  - 0 : Rotate Picture is disabled or not applicable.
  - 1 : Rotate Picture is enabled.
- **OB22**: FINE TUNING
  - 0 : Fine Tuning for Channel Offset is disabled or not applicable.
  - 1 : Fine Tuning for Channel Offset is enabled.

Option Byte 3 (OP3)
- **OB36**: ATI_PIP
  - 0 : PIP feature is disabled
  - 1 : PIP feature is enabled
- **OB33**: VIRTUAL DOLBY
  - 0 : Virtual Dolby is not applicable.
  - 1 : Virtual Dolby is applicable.
- **OB32**: WIDE SCREEN
  - 0 : Software is used for 4:3 sets or not applicable.
  - 1 : Software is used for 16:9 sets.

Option Byte 4 (OP4)
This option byte is not used.

Option Byte 5 (OP5)
- **OB57**: AV1
  - 0 : AV1 source is not present.
  - 1 : AV1 source is present.
- **OB56**: AV2
  - 0 : AV2 source is not present.
  - 1 : AV2 source is present.
  - Note : For EU, when AV2="1", both EXT2 and SVHS2 should be included in the OSD loop.
- **OB55**: AV3
  - 0 : Side/Front AV3 source is not present.
  - 1 : Side/Front AV3 source is present.
- **OB54**: CVI
  - 0 : CVI source is not available.
  - 1 : CVI source is available.
- **OB53**: SVHS2
  - 0 : SVHS2 source is not available.
  - 1 : SVHS2 source is available.
  - Note : This option bit is not applicable for EU.
- **OB52**: SVHS3
  - 0 : SVHS3 source is not available.
  - 1 : SVHS3 source is available.
  - Note : This option bit is not applicable for EU.
- **OB51**: HDMI
  - 0 : HDMI source is not present.
  - 1 : HDMI source is present.
- **OB50**: YPbPr
  - 0: YPbPr source is not present.
  - 1: YPbPr source is present.

Option Byte 6 (OP6)
- **OB67**: QUADRA_SURF
  - 0 : Quadra Surf feature is disabled or not applicable.
  - 1 : Quadra Surf feature is enabled.
- **OB66**: OP_SMART_SURF
  - 0 : Smart Surf key is not used on remote control.
  - 1 : Smart Surf key is used on remote control.
- **OB64**: COMBFILTER
  - 0 : 3D-combfilter is not present.
  - 1 : 3D-combfilter is present.
- **OB63**: ACTIVE CONTROL
  - 0 : Active Control feature is disabled or not applicable.
  - 1 : Active Control feature is enabled.

Note: Quadra Surf option is only applicable for Philips branded sets.

Option Byte 7 (OP7)
- **OB73**: Digital Module Reset Control
  - 0: Reset control is not used.
  - 1: Reset control is used.

8.3.2 Tuner

Note: Described alignments are only necessary when the NVM (item 7601) is replaced.

IF PLL
This adjustment is auto-aligned. Therefore, no action is required.

AGC (AGC take over point)
1. Set the external pattern generator to a color bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 61.25 MHz (channel 3).
2. Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).
3. Activate the SAM.
4. Go to the TUNER sub menu.
5. Select AGC with the UP/DOWN cursor keys.
6. Adjust the AGC-value with the LEFT/ RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V (default value is "20").
7. Switch the set to STANDBY, in order to store the alignments.

CL (Cathode drive level)
Always set to "5".

8.3.3 White Tone

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed, and you can use the given default values.
The color temperature mode (NORMAL, COOL and WARM) and the color (R, G, and B) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL color temperature. Then select the values for the COOL and WARM mode. After alignment, switch the set to STANDBY, in order to store the alignments.

8.3.4 Geometry

The geometry alignments menu contains several items to align the set, in order to obtain correct picture geometry.

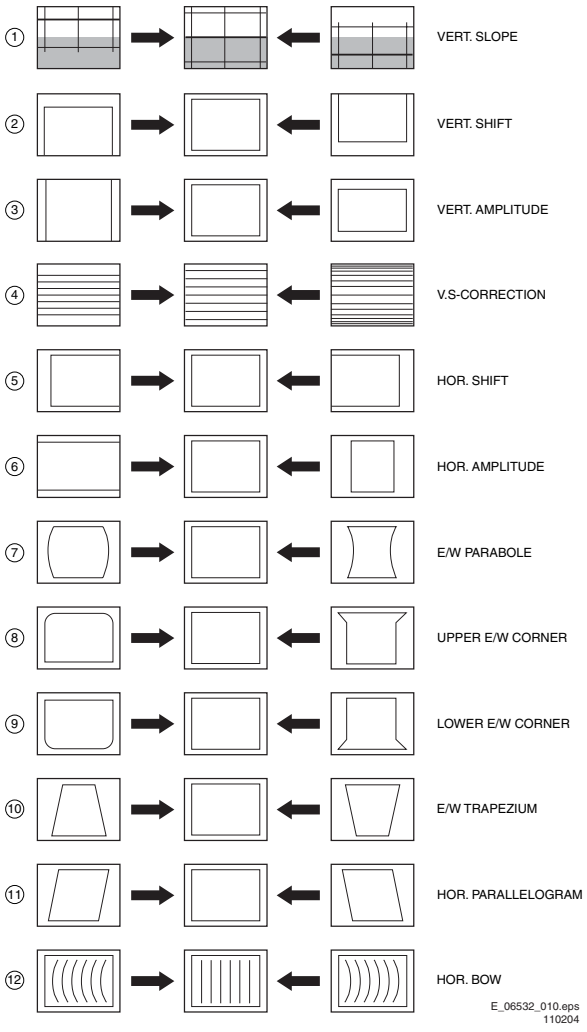


Figure 8-4 Geometry alignments

1. Connect an **external** video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 61.25 MHz (channel 3).
2. Set 'Smart Picture' to NATURAL (or MOVIES).
3. Activate the SAM menu (see chapter 5 “Service Modes, ...”).
4. Go to the GEOMETRY sub menu.
5. Choose HORIZONTAL or VERTICAL alignment.

Now the following alignments can be performed:

Horizontal

- **Horizontal Parallelogram (HP).** Align straight vertical lines in the top and the bottom; vertical rotation around the center.
- **Horizontal Bow (HB).** Align straight horizontal lines in the top and the bottom; horizontal rotation around the center.
- **Horizontal Shift (HSH).** Align the horizontal center of the picture to the horizontal center of the CRT.
- **East West Width (EWW).** Align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP).** Align straight vertical lines at the sides of the screen.
- **East West Trapezium (EWT).** Align straight vertical lines in the middle of the screen.
- **Upper Corner Parabola (UCP).** Align straight vertical lines in the upper corners of the screen.
- **Lower Corner Parabola (LCP).** Align straight vertical lines in the lower corners of the screen.
- **East West S correction (EWS).** Default value is “16”.
- **East West Corner (EWC).** Align straight vertical lines at the top and bottom of the sides.

Vertical

- **Service blanking (SBL).** Switch the blanking of the lower half of the screen “on” or “off” (to be used in combination with the vertical slope alignment).
- **Vertical Shift (VSH).** Align the vertical centering so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Vertical Amplitude (VAM).** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (VSC).** Align the vertical linearity, meaning that vertical intervals of a grid pattern must be equal over the entire screen height.
- **Vertical Zoom (VX, if present).** The vertical zoom is added in for the purpose of development. It helps the designer to set proper values for the movie expand or movie(16x9) compress. Default value is “25”.
- **Vertical Symmetry (VSL).** Fine tune the vertical centering. Only perform this alignment if it is strictly necessary.
- **Vertical Linearity (VL).** Align the top half and bottom half of the picture to be of equal height.

8.3.5 Audio

No alignments are needed for the audio sub menu. Use the given default values.

FMI (Freq. Modulation Intercarrier)

- For NICAM/2CS sound system (EU/AP, except for APNTSC): set to “On”.
- For AV-Stereo sound system (sets without NICAM): set to “Off”.
- For dBx/non-dBx sound systems: set to “On”.

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

9.1 Introduction
9.2 Power Supply
9.3 Video Processing
9.4 Audio Processing
9.5 Deflection Controller
9.6 Abbreviation List
9.7 IC Data Sheets

Notes:

- Only **new** circuits compared to the L05U chassis are described in this chapter. For the other circuit descriptions, see the manual of the L05U chassis.
- Because the service offering for the ATSC part is “Repair by supplier” this part is not described in this chapter.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in sections “Block Diagrams, ...”, and/or “Electrical Diagrams”. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The L05 ATSC chassis is designed for the model year 2005. This set has a fully integrated ATSC as well as a NTSC tuning system. This set will come in a 26 and 30 inch screen sizes in a 16x9 format. There will be a 32 inch version using a 4x3 ratio screen.

The set consists of a Main panel, CRT board, Side I/O panel, ATSC module, and Deflection controller panel. The panels consists primarily of conventional components with some surface mounted devices.

The The functions for the 1fH video processing is performed in one IC (TDA1200xx, IC7200), the Hercules chip. This IC is located on the solder side of the Main panel. NTSC tuning and switching for AV1, AV2, and CVI inputs are performed on the Main panel. The CVI input located on the Main panel are for 1fH (480i) signals only.

The ATSC Tuner and 1fH to 2Fh conversion is performed on the ATSC module. Component inputs for the CVI HD and HDMI are located on the ATSC module. This input can accept 480i, 480p, 1080i, or 720p signals. The ATSC module converts whatever signal is applied to a 1080i format. The ATSC tuning system can tune all channels in the VHF, UHF, and Cable bands.

The Microprocessor communicates with the memory IC located on the Main panel, Keyboard, Remote Receiver, NTSC Tuner, Deflection Controller panel, and ATSC module. The Memory IC retains the settings for favorite stations, customer-preferred setting, and circuit settings. The circuit settings can be accessed by the service technician via the Service Alignment Mode.

On-screen graphics and Closed Caption decoding are performed in IC 7200 for NTSC. IC7200 is located on the Main signal panel. On-screen graphics and Closed Caption for the ATSC channels are performed in the ATSC module..

9.2 Power Supply

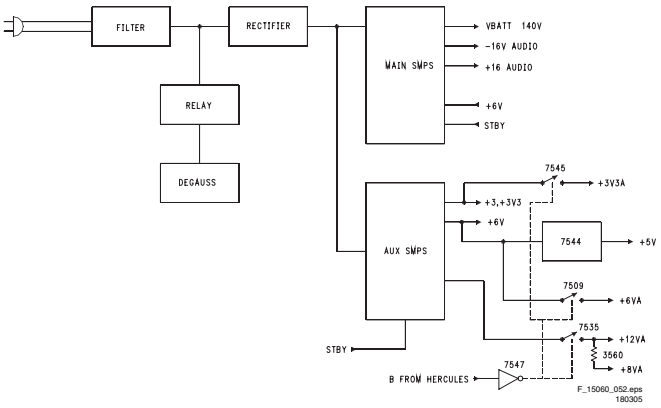


Figure 9-1 Power supply block diagram

The supply is divided into two sections, the Auxiliary and Main section, both located on the family board. A single filter and rectifier circuit supplies both sections. The Auxiliary supply operates in a low power mode when the load is reduced. In the standby mode, the 3.3 and 6 volt supplies are operating. The 3.3 volt supply provides power to the processor section of the Hercules. The 6 volt supply provides power to the IR receiver. The Main supply is switched Off via the Standby line.

When the set is turned On, the "B" line from the Hercules processor goes High switching 7547 which turns 7535, 7509, and 7545 On. The +3V3A, +6VA, +12VA, and +8VA supplies are then switched On. The load placed on the Aux Power supply will cause it to switch to the full power mode. At the same time, the STBY line switches Low turning the Main SMPS supply On. The supply produces a +6 volt, +140 volt, -16 volt, and +16 volt supplies.

The +Vaudio (+16 volt) supply switches on the degauss relay.

9.2.1 Auxiliary Power Supply

IC 7510 is the heart of the Auxiliary Power supply. In the Standby mode, via the current sensing and Control circuits, a low power condition is detected by the IC. The IC then goes into a Burst Mode operation to reduce the power used by the circuit. In the Burst Mode, the supply will operate at approximately 25 kHz. In full power operation the frequency will be approximately 66 kHz.

When power is first applied to the set, Start up is supplied to the IC by the internal Start-Up current through Pin 14. Startup voltage is also applied to the IC to Pin 2 by the AC_IN line which is tied to the neutral side of the AC line. During normal operation, power is supplied to the IC by the HOT windings, Pins 1 and 2, of transformer 5504. Output drive from Pin 11 is applied to the Gate of Transistor 7525. Voltage developed across the current sensing resistors in the Source of 7525 provides current sense information to the IC. When 7525 is switched Off, the voltage on Pin 1 of 5504 goes High. This winding supplies the operating voltage the power supply circuit. It also turns Transistor 7567 On causing the Gate of 7525 to stay Low as long as Pin 1 of 5504 is High. This prevents 7525 from turning On until the field of 5504 has collapsed.

Regulation is accomplished by monitoring the +3 volt supply. This voltage is fed to Shunt regulator 7542 which controls the current through opto-isolator 7516. Shunt Regulator 7542 begins conducting when Pin 3 of the IC reaches 2.5 volts. At

this point current flows through the opto-isolator, 7516. The transistor inside 7516 turns On applying a control voltage to Pin 6 of 7510. If a problem should develop in the feedback circuit causing an excessive voltage on Pin 6, Transistor 7549-2 will turn On, switching Transistor 7532 On. This will a voltage to the Demag circuit on Pin 7 causing the IC to latch Off. The IC will stay latched until power is removed and reapplied to the set.

In the Standby mode, the "B" control line from the Hercules Processor is Low. Only the +3, +3V3, and +6 volt supplies are present. When the set is turned On, the "B" line will go High, turning Transistors 7509, 7545, and 7535 On. This will switch On the +8VA, +12VA, +8V, +3V3A, +6VA, and +5V supplies.

In normal operation, voltage from Pin 12 of 5504 is rectified by 6540 to produce a negative voltage which prevents Transistor 7561 from turning On. If AC is removed from the set, this negative voltage will disappear. The voltage across the filter capacitors on the +3V line will turn 7561 On. The Power Down line will then go Low signaling the processor to shut the set down.

9.2.2 Main Power Supply

The Main Power supply provides the VBAT (141 volt), and Audio voltage supplies. This supply is switched Off during the Standby mode. During Standby the STBY_Con line is High which turns Transistor 7573 On. This causes the opto-isolator 7513 to turn On hard. This places a higher voltage on the control Pin of IC 7511 causing the IC to shut down. The operating voltage from the Auxiliary supply keeps a small voltage on Pin 2 of 7511 to prevent it from cycling On and Off.

When the set is turned On, the STBY_Con line goes Low switching 7573 Off. The VBAT supply is the reference voltage for regulation. Since this voltage is missing during startup, the Shunt Regulator 7571 is turned Off. The voltage on Pin 6 of 7511 goes Low, which turns the drive from the IC On. When the set is On during normal operation, the supply voltage on Pin 2 of the IC is supplied by Pin 2 of Transformer 5512. When the VBAT supply reaches the correct voltage, Pin 3 of the Shunt Regulator 7571 reaches 2.5 volts switching it On. This switches the opto-isolator On to provide a regulation feedback path.

Transistor 6551 provides a power on ramping of the VBAT supply.

9.3 Video Processing

The video processing section located on the Mono Carrier performs all of the 1fH processing. AV1, AV2, CVI, and Side inputs are fed to this board. The CVI input on this board will only accept 1fH signals. 1fH RGB signals from the Hercules are fed to the ATSC module via the deflection controller board. The ATSC module rescales the picture from the Hercules. It also has an HDMI and CVI connection. The HDMI and CVI connections can accept either 480i, 480p, 720p, or 1080i. The ATSC module also has a built in Digital Tuner. The ATSC module resizes the picture to 1080i regardless of the input.

9.4 Audio Processing

The audio decoding is done entirely via the Hercules, IC 7200. The analogue IF output from the Tuner is fed directly to either the Video-IF or the Sound-IF input depending on the type of concept chosen. There are mainly two types of decoder in the Hercules, an analog decoder that decodes only Mono, regardless of any standards, and a digital decoder (or DEMDEC) that can decode both Mono as well as Stereo, again regardless of any standards.

Audio from the ATSC board is fed to the Hercules.

9.5 Deflection Controller

The Deflection panel performs the signal processing and Deflection processing functions. YPbPr from the ATSC module is fe to 7402 signal processor. This circuit performs the Color, Tint, Brightness, and Contrast control functions. The Y signal is fed to a Sync Separator to separate the Horizontal and Vertical Sync which is output on Pins 37 and 35. RGB is output on Pins 12, 13, and 14. These signals are sent to the CRT panel.

Horizontal drive is output on Pin 37 where it is fed to the deflection circuits on the Family board. Vertical Sync is output on Pin 35 of 7402 to IC 7404. IC 7404 develops the Vertical and EW drivefor the deflection circuits.

DC monitor signals are output on Pins 4, 6, and 7 of 7402 and fed to an Undervoltage detection circuit. If a positive or negative voltage develops on any of these lines, this circuit will force Pin 21 of 7404 Low, causing the set to shut down. The shutdown is actaviated when Pin 21 goes below 5 volts.

9.6 Abbreviation List

2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific region
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
ATSC	Advanced Television Systems Committee; HDTV standard for the USA, using MPEG2 for video and Dolby Digital for audio
AV	External Audio Video
AVL	Automatic Volume Leveler
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
CC	Closed Caption
CCC	Continuous Cathode Calibration
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
DAC	Digital to Analogue Converter
DBX	Dynamic Bass Expander or noise reduction system in BTSC
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
EPG	Electronic Programming Guide
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Field Memory or Frequency Modulation
H	Horizontal sync signal
HP	Headphone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency
IIC	Integrated IC bus
ITV	Institutional TV
LATAM	Latin American countries like Brazil, Argentina, etc.
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Large Screen or Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Bit
OC	Open Circuit
OP	Option Byte
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red, Green, and Blue video signals
ROM	Read Only Memory
SDAM	Service Default / Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock
SDA	Serial Data
SECAM	SEequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOC	Ultimate One Chip
UVSH	UHF, VHF, S-, and Hyper- band
V	Vertical sync signal
V_BAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder

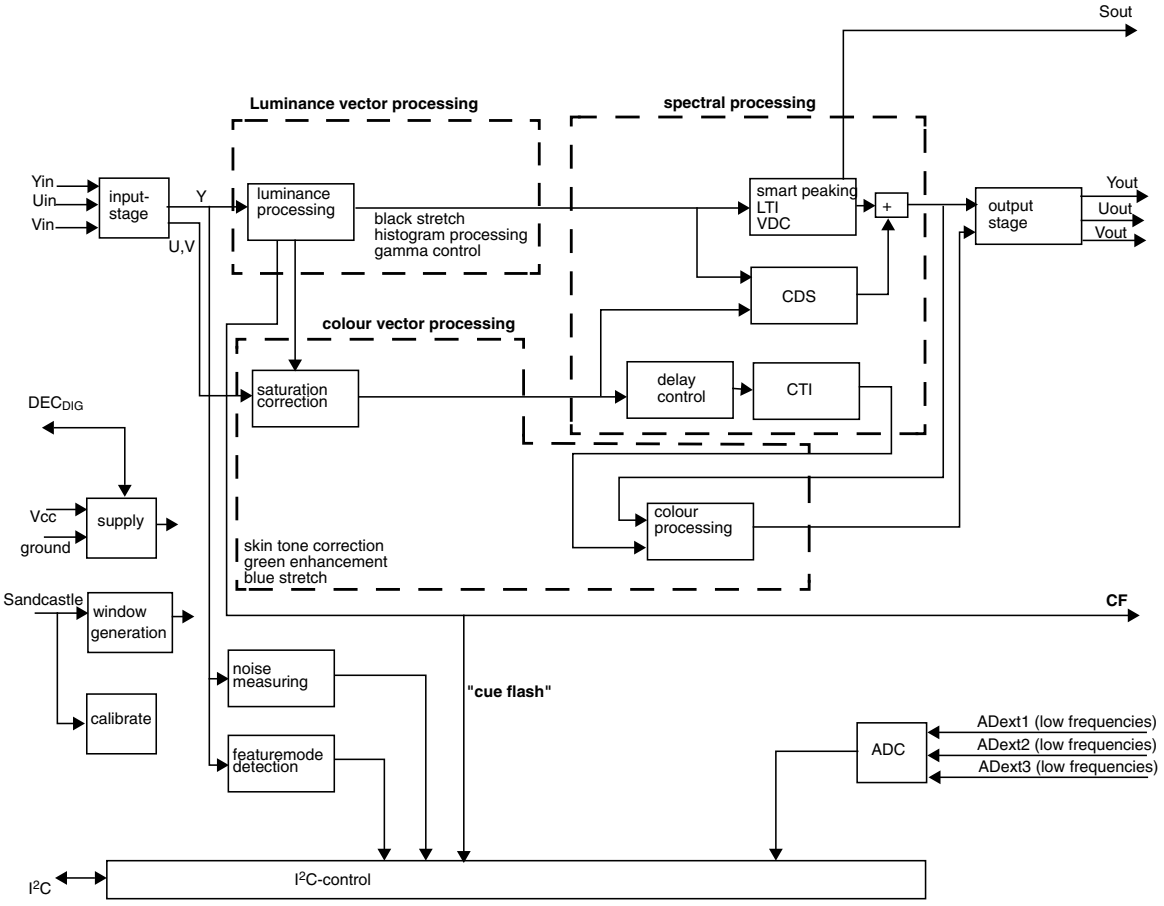
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.7 IC Data Sheets

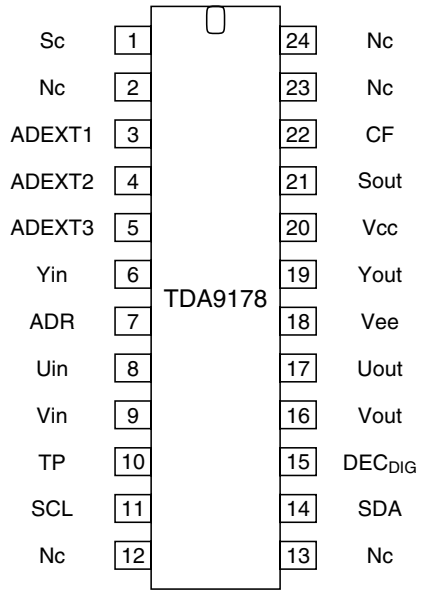
This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.7.1 Diagram H, TDA9178 (IC7610)

BLOCK DIAGRAM



PIN CONFIGURATION



E_14480_075.eps
270204

Figure 9-2 Internal Block Diagram and Pin Configuration

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../../SPMSgraphs/2004/E_14480_039.eps 49
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../../SPMSgraphs/2005/F_15050_057.eps 51
../../SPMSgraphs/2005/F_15050_058.eps 51
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../../SPMSgraphs/2005/F_15060_043.eps 7
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SPARE PARTS LIST

MODEL "A" = 26PW9100D
MODEL "B" = 30PW9100D
MODEL "C" = 30PW9110D
MODEL "D" = 32PT9100D

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

REF.	⚠	MODEL	DESCRIPTION	PART NO.
			CABINET PARTS	
8		D	BC 34WDPV22 ATSC QAM/NA	313912462421
16		D	AS MAINSKNOB PV2/11027/NA	313917771181
16		ABC	AS MAINSKNOB FL13B/10942/NA	313917788861
41		D	PV2 LENS (USA)	313912439701
50		C	Nameplate	313912001301
50		BD	Nameplate	314105000281
50		A	Nameplate	314105000291
106		BC	Yoke Wedge	312123320091
125			Instruction Book	313912533641
145			Quick Use Guide	313912533631
164			Quick Connection Guide (FR)	313912534951
166			Quick Connection Guide (SP)	313912534961
167			Quick Connection Guide (ENG)	313912534971
1081			Battery, Zinc, 1.5V (2-Pack)	929900065263
1085			Remote Transmitter	312814717131
1099		D	CRT A80ERF182X45N	930194880539
1099		A	CRT W66QDS770XV2N	930198420522
1099		BC	CRT W76QEN691X100	932221772682
1127		A	Defl - Control Assy	313918887411
1127		D	Defl - Control Assy	313926712921
1128		D	MOD-DIGITAL-ATSC-HDMI-4:3	313926710201
1128		ABC	MOD-DIGITAL-ATSC-HDMI-16:9	313926714311
5203		A	Degauss Coil	313912823931
5203		BC	Degauss Coil	313912823941
5203		D	Degauss Coil	313912824021
5205			Coil	242254945605
5213		D	Speaker 8 ohm 15W Full-range	242226400484

5213	ABC	Speaker 8 ohm 10W Full-range	242226400491
5214	D	Speaker 8 ohm 15W Full-range	242226400484
5214	ABC	Speaker 8 ohm 10W Full-range	242226400491
8190		AC Cord	242207000066
9950	BC	Back cover Sub-Assy	312123755801
9950	A	Back cover Sub-Assy	312123755821
9960	A	Front cover Sub-Assy	312123755831
		MAIN CHASSIS	
CBA	A	Main Chassis Assy	313918887221
CBA	BC	Main Chassis Assy	313918885131
CBA	D	Main Chassis Assy	313918887231
1000		Tuner	313914723541
1002		SAW Filter, 45MHz75, OFWM1971M	242254944518
1005		Connector, 3 Pin	241202000725
1050	BC	MC-30PW9100D.9200D/37-NA ATSC	313918885151
1050	A	MC-26PW9100D.9200D/37-NA-ATSC	313918887241
1050	D	MC-32PT9100D/37-NA-ATSC	313918887251
1137		4 Pin Cinch Socket	242202605659
1205		Crystal Resonator 24MHZ576	242254301421
1206		Connector, 6 Pin	242202508149
1207		Connector, 7 Pin	242202511244
1208		Connector, 3 Pin	242202510768
1219		Connector, 4 Pin	242202509406
1250		Connector, 12 Pin	242202516052
1251		Connector, 10 Pin	242202516051
1257		Connector, 3 Pin	241202000725
1280		Connector, 5 Pin	242202512481
1401		Connector, 7 Pin	242202511244
1404		Connector, 2 Pin	242202516269
1451		Connector, 3 Pin	241202000725
1500		FUSE 5X20 HT 6A3 250V IEC B	242208600194
1503		RELAY 1P 12V 5A	242213207467
1504		Connector, 2 Pin	242202516375
1505		Connector, 2 Pin	242202516269
1533		Connector, 12 Pin	242202510772
1534		8 Pin Board Connector	242202508151
1535		Connector, 3 Pin	241202000725
1546		WIRE SIN 680 POSI 18ST BK	313913105261
1682		Connector, 3 Pin	241202000725
1693		Connector, 6 Pin	242202512482
2001		Cap, 22p, 5%, 50V, Ceramic	319801632290
2004		Cap, 47n, +80/-20%, 50V, Ceramic	319802444730
2005		Cap, 4u7, 20%, 50V, Electrolytic	319802554780
2006		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2007		Cap, 100n, 10%, 16V, Ceramic	319801731040

2008	Cap, 100u, 20%, 25V, Electrolytic	319802531010
2011	Cap, 100n, 10%, 16V, Ceramic	319801731040
2012	Cap, 100n, 10%, 16V, Ceramic	319801731040
2122	Cap, 330p, 10%, 50V, Ceramic	319801733310
2123	Cap, 2u2, 20%, 50V, Electrolytic	319802552280
2124	Cap, 330p, 10%, 50V, Ceramic	319801733310
2125	Cap, 2u2, 20%, 50V, Electrolytic	319802552280
2131	Cap, 330p, 10%, 50V, Ceramic	319801733310
2132	Cap, 2u2, 20%, 50V, Electrolytic	319802552280
2133	Cap, 330p, 10%, 50V, Ceramic	319801733310
2134	Cap, 2u2, 20%, 50V, Electrolytic	319802552280
2203	Cap, 100u, 20%, 10V, Electrolytic	319802511010
2204	Cap, 22n, 10%, 25V, Ceramic	319801732230
2205	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2206	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2207	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2208	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2209	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2210	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2211	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2212	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2213	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2214	Cap, 100n, 10%, 16V, Ceramic	319801731040
2215	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2216	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2217	Cap, 470u, 20%, 10V, Electrolytic	319802514710
2218	Cap, 47u, 20%, 25V, Electrolytic	319802534790
2223	Cap, 100n, 10%, 16V, Ceramic	319801731040
2224	Cap, 100u, 20%, 25V, Electrolytic	319802531010
2225	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2226	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2229	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2231	Cap, 100n, 10%, 16V, Ceramic	319801731040
2232	Cap, 100n, 10%, 16V, Ceramic	319801731040
2233	Cap, 100n, 10%, 16V, Ceramic	319801731040
2234	Cap, 100u, 20%, 25V, Electrolytic	319802531010
2235	Cap, 6n8, 10%, 50V, Ceramic	319801736820
2237	Cap, 100n, 10%, 16V, Ceramic	319801731040
2238	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2239	Cap, 220n, +80/-20%, 16V, Ceramic	319801742240
2240	Cap. 1u5, 20%, 50V, Electrolytic	202002190137
2241	Cap, 22n, 10%, 25V, Ceramic	319801732230
2242	Cap, 100n, 10%, 16V, Ceramic	319801731040
2244	Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
2249	Cap, 100n, 10%, 16V, Ceramic	319801731040
2250	Cap, 100u, 20%, 25V, Electrolytic	319802531010

2251		Cap, 10n, +80/-20%, 50V, Ceramic	319801921030
2253		Cap, 10n, 10%, 50V, Ceramic	319801731030
2255		Cap, 10n, 10%, 50V, Ceramic	319801731030
2256		Cap, 100n, 10%, 16V, Ceramic	319801731040
2257		Cap, 3n3, 10%, 50V, Ceramic	319801733320
2260		Cap, 100n, 10%, 16V, Ceramic	319801731040
2261		Cap, 100n, 10%, 16V, Ceramic	319801731040
2262		Cap, 10n, 10%, 50V, Ceramic	319801731030
2263		Cap, 100n, 10%, 16V, Ceramic	319801731040
2264		Cap, 560p, 5%, 25V, Ceramic	319801635610
2265		Cap, 100u, 20%, 25V, Electrolytic	319802531010
2266		Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
2267		Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
2272		Cap, 100n, 10%, 16V, Ceramic	319801731040
2273		Cap, 100u, 20%, 25V, Electrolytic	319802531010
2274		Cap, 100n, 10%, 16V, Ceramic	319801731040
2275		Cap, 10u, 20%, 50V, Electrolytic	319802551090
2276		Cap, 100n, +80/-20%, 25V, Ceramic	319802321040
2279		Cap, 100p, 5%, 50V, Ceramic	319801631010
2280		Cap, 1u, +80/-20%, 10V, Ceramic	319801741050
2282		Cap, 1n, 10%, 50V, Ceramic	319801731020
2291		Cap, 10u, 20%, 50V, Electrolytic	319802551090
2292		Cap, 10u, 10%, 6.3V, Ceramic	202055296637
2293		Cap, 470p, 5%, 50V, Ceramic	319801634710
2404		Cap, 47u, 20%, 160v, Electrolytic	202203100103
2407		Cap, 330p, 5%, 50V, Ceramic	319801633310
2409		Cap, 33n, 10%, 50V, Ceramic	319801703330
2410		Cap, 100n, 10%, 16V, Ceramic	319801701040
2411	A	Cap, 1n, 10%, 2KV, Ceramic	319801971020
2411	BC	Cap, 220p, 10%, 2KV, Ceramic	319801972210
2411	D	Cap, 330p, 10%, 2KV, Ceramic	319801973310
2412	ABC	Cap, 12n, 1600V, 5%, Metalized Polypropylene	202233300254
2412	⚠ D	Cap, 10n, 5%, 1600V, Polypropylene	222237590154
2413	BC	Cap, 33n, 10%, 400V, POL PEN	202232000014
2413	AD	Cap, 27n, 5%, 630v, Polypropylene	222237590223
2418		Cap, 330n, 250V, 5%, Metalized Polypropylene	202233300259
2419	AD	Cap, 560n, 5%, 250V, Metalized Polypropylene	202233300088
2419	BC	Cap, 1u2, 5%, 250V, Metalized Polypropylene	222247990034
2421	BC	Cap, 220p, 10%, 2KV, Ceramic	319801972210
2422	BC	Cap, 220p, 10%, 2KV, Ceramic	319801972210
2426		Cap, 470p, 10%, 200V, Ceramic	223893055618
2431		Cap, 680p, 10%, 500V, Ceramic	319801946810
2436		Cap, 1u, 20%, 250V, Electrolytic	202001293279
2448		Cap, 470p, 10%, 200V, Ceramic	223893055618
2449		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2451	⚠	Cap, 68n, 10%, 250V, Metalized Polyester	222236545683

2454		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2459		Cap, 470p, 10%, 200V, Ceramic	223893055618
2460		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2461		Cap, 22u, 20%, 100V, Electrolytic	319802572290
2462		Cap, 2n2, 10%, 50V, Ceramic	319801732220
2463		Cap, 2n2, 10%, 50V, Ceramic	319801732220
2464		Cap, 100n, +80/-20%, 25V, Ceramic	319802321040
2465		Cap, 220n, +80/-20%, 50V, Ceramic	223858019814
2466		Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
2467		Cap, 220n, +80/-20%, 50V, Ceramic	223858019814
2468		Cap, 470n, 10%, 100V, Metalized Polyester	222236525474
2469		Cap, 22u, 20%, 100V, Electrolytic	319802572290
2470		Cap, 100n, 10%, 100v, Ceramic	222260155649
2477		Cap, 8n2, 10%, 50V, Ceramic	223858015635
2478		Cap, 15n, 10%, 50V, Ceramic	319801701530
2488		Cap, 1u, 10%, 50V, Polyester	319801401050
2491		Cap, 4u7, +80/-20%, 10V, Ceramic	202055296305
2492		Cap, 470p, 10%, 200V, Ceramic	223893055618
2493		Cap, 470p, 10%, 200V, Ceramic	223893055618
2494		Cap, 470p, 10%, 200V, Ceramic	223893055618
2496		Cap, 10n, 10%, 50V, Ceramic	319801731030
2497		Cap, 220p, 5%, 50V, Ceramic	319801632210
2499		Cap, 2u2, +80/-20%, 16V, Ceramic	202055295447
2500		Cap, 470n, 20%, 275V, Metalized Polypropylene	222233822474
2501		Cap, 2n2, 10%, 1KV, Ceramic	319801952220
2503		Cap, 2n2, 10%, 1KV, Ceramic	319801952220
2504		Cap, 2n2, 10%, 1KV, Ceramic	319801952220
2505		Cap. 680u, 20%, 200V, Electrolytic	202002490723
2508	⚠	Cap, 100n, 20%, 275V, Metalized Polypropylene	222233822104
2510		Cap, 47u, 20%, 50V, Electrolytic	319802554790
2511		Cap, 22u, 20%, 50V, Electrolytic	319802552290
2512		Cap, 100n, 10%, 16V, Ceramic	319801731040
2513		Cap, 470p, 5%, 50V, Ceramic	319801634710
2514		Cap, 1n5, 10%, 2KV, Ceramic	319801971520
2515		Cap, 1n, 10%, 50V, Ceramic	319801731020
2516		Cap, 100n, 10%, 16V, Ceramic	319801731040
2517		Cap, 1n, 10%, 50V, Ceramic	319801731020
2519		Cap, 470p, 5%, 50V, Ceramic	319801634710
2520		Cap, 100n, 10%, 16V, Ceramic	319801731040
2521		Cap, 47n, 10%, 16V, Ceramic	319801734730
2522		Cap, 470p, 5%, 50V, Ceramic	319801634710
2523		Cap, 330p, 10%, 1KV, Ceramic	319801963310
2524		Cap, 1n, 10%, 100V, Ceramic	223860056623
2525		Cap, 470p, 5%, 50V, Ceramic	319801634710
2526		Cap, 100n, 10%, 50V, Ceramic	222258015649
2528		Cap, 470n, 10%, 50V, Polyester	319801404740

2534		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2535		Cap, 4700u, 20%, 6.3V, Electrolytic	202002100092
2536		Cap, 2u2, 20%, 16V, Electrolytic	319802622220
2538		Cap, 1n, 10%, 50V, Ceramic	319801731020
2539		Cap, 470p, 10%, 500V, Ceramic	319801944710
2541		Cap, 47u, 20%, 25V, Electrolytic	319802534790
2542	⚠	Cap, 1n5, 20%, 250v, Ceramic	202055490199
2543		Cap, 100n, 10%, 16V, Ceramic	319801731040
2544		Cap, 2n2, 10%, 500V, Ceramic	319801942220
2551		Cap, 1n, 10%, 1KV, Ceramic	319801961020
2552		Cap. 150u, 20%, 160V, Electrolytic	202002100112
2561		Cap, 1n, 10%, 50V, Ceramic	319801911020
2562		Cap, 2u2, 20%, 25V, Electrolytic	202001293402
2563		Cap, 2u2, 20%, 25V, Electrolytic	202001293402
2564		Cap, 100n, 10%, 50V, Ceramic	222258015649
2565		Cap, 1n, 10%, 100V, Ceramic	223860056623
2570	⚠	Cap, 470p, 10%, 250V, Ceramic	202055490169
2571		Cap, 15n, 10%, 50V, Ceramic	319801731530
2572		Cap, 10n, 10%, 50V, Ceramic	319801731030
2575		Cap, 10n, 10%, 50V, Ceramic	319801731030
2576		Cap, 100n, 10%, 16V, Ceramic	319801731040
2577		Cap, 100u, 20%, 16V, Electrolytic	319802821010
2578		Cap, 2n2, 10%, 50V, Ceramic	319801732220
2579		Cap, 100n, 10%, 16V, Ceramic	319801731040
2580		Cap, 15n, 10%, 400V, Polyester	222234790219
2582		Cap, 1u, +80/-20%, 25V, Ceramic	202055296723
2583		Cap, 10u, 10%, 6.3V, Ceramic	202055296637
2584		Cap, 470u, 20%, 6.3V, Electrolytic	319802504710
2585		Cap, 1u, +80/-20%, 25V, Ceramic	202055296723
2587		Cap, 470u, 20%, 10V, Electrolytic	319802514710
2590		Cap, 4700u, 20%, 10V, Electrolytic	202002100101
2591		Cap, 1n, 10%, 50V, Ceramic	319801731020
2592		Cap, 68p, 5%, 50V, Ceramic	319801636890
2601		Cap, 1n, 5%, 25V, Ceramic	319801631020
2611		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2615		Cap, 4u7, +80/-20%, 10V, Ceramic	202055296305
2617		Cap, 100n, 10%, 16V, Ceramic	319801731040
2620		Cap, 100n, 10%, 16V, Ceramic	319801731040
2621		Cap, 100u, 20%, 25V, Electrolytic	319802531010
2623		Cap, 100n, 10%, 16V, Ceramic	319801731040
2624		Cap, 100u, 20%, 25V, Electrolytic	319802531010
2625		Cap, 2u2, 10%, 6v3, Ceramic	202255205615
2632		Cap, 6n8, 10%, 50V, Ceramic	319801736820
2633		Res, Zero ohm, 'Chip' Jumper	319802190030
2634		Res, Zero ohm, 'Chip' Jumper	319802190030
2986		Cap, 100n, 10%, 16V, Ceramic	319801731040

2987	Cap, 100n, 10%, 16V, Ceramic	319801731040
2988	Cap, 100n, 10%, 16V, Ceramic	319801731040
2989	Cap, 2u2, 10%, 6.3V, Ceramic	202055200183
2990	Cap, 1n, 5%, 25V, Ceramic	319801631020
2992	Cap, 2u2, 10%, 6.3V, Ceramic	202055200183
2993	Cap, 1n, 5%, 25V, Ceramic	319801631020
2994	Cap, 22n, 10%, 25V, Ceramic	319801732230
2995	Cap, 22n, 10%, 25V, Ceramic	319801732230
2996	Cap, 47n, +80/-20%, 50V, Ceramic	319802444730
2997	Cap, 47n, +80/-20%, 50V, Ceramic	319802444730
2998	Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
3003	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3004	Res, 68K, 5%, 1/16W, Metalized Glass	319802136830
3005	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3121	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3123	Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3124	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3125	Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3126	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3129	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3130	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3131	Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3132	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3133	Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3134	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3135	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3167	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3168	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3169	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3201	Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3202	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3203	Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
3204	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3205	Res, 12K, 5%, 1/16W, Metalized Glass	319802131230
3206	Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3207	Res, 10 ohm, 5%, 1/16W, Metalized Glass	319802131090
3208	Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3209	Res, 1 ohm, 5%, 1/16W, Metalized Glass	319802131080
3210	Res, 1 ohm, 5%, 1/16W, Metalized Glass	319802131080
3211	Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3212	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3214	Res, 10 ohm, 5%, 1/16W, Metalized Glass	319802131090
3215	Res, 4K7, 5%, 1/6W, Carbon Film	319801104720
3216	Res, 10 ohm, 5%, 1/16W, Metalized Glass	319802131090
3218	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3219	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030

3220	Res, 150 ohm, 5%, 1/16W, Metalized Glass	319802131510
3221	Res, 270 ohm, 5%, 1/16W, Metalized Glass	319802132710
3222	Res, 330 ohm, 5%, 1/16W, Metalized Glass	319802133310
3226	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3227	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3228	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3229	Res, 1K5, 5%, 1/16W, Metalized Glass	319802131520
3231	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3232	Res, 12K, 5%, 1/16W, Metalized Glass	319802131230
3238	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3241	Res, 39K, 5%, 1/6W, Carbon Film	319801103930
3242	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3246	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3247	Res, 390 ohm, 5%, 1/16W, Metalized Glass	319802133910
3248	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3249	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3252	Res, 10K, 5%, 1/6W, Carbon Film	319801101030
3253	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3257	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3258	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3260	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3261	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3262	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3263	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3264	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3265	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3266	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3269	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3270	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3272	Res, 820 ohm, 5%, 1/16W, Metalized Glass	319802138210
3273	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3274	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3275	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3276	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3277	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3278	Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3279	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3280	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3281	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3283	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3284	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3285	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3287	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3291	Res, 4K7, 5%, 1/6W, Carbon Film	319801104720
3292	Res, 4K7, 5%, 1/10W, Metalized Glass	319802154720
3293	Res, 10 ohm, 5%, 1/6W, Carbon Film	319801101090

3296			Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3298			Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3401			Res, 47k ohm, 1%, 1/16W, Metal Film	319803947030
3402			Res, 330 ohm, 5%, 1/6W, Carbon Film	319801103310
3408			Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3413			Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3414		ABC	Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3414		D	Res, 6.8 ohm, 1%, 1/16W, Metal Film	319803968080
3415		ABC	Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3415		D	Res, 6.8 ohm, 1%, 1/16W, Metal Film	319803968080
3416			Res, 47 ohm, 5%, 1/16W, Metalized Glass	319802134790
3419		ABC	Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3419		D	Res, 6.8 ohm, 1%, 1/16W, Metal Film	319803968080
3421			Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3424	⚠	BC	VDR DC 1MA/612V S MAX 1100V A	232259214217
3425	⚠	BC	VDR DC 1MA/612V S MAX 1100V A	232259214217
3431			Res, 82k ohm, 1%, 1/16W, Metal Film	319803982030
3433		D	Res, 10 ohm, 1%, Metal Film	319803910090
3433		ABC	Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3439			Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3440			Res, 2.2 ohm, 1%, 1/16W, Metal Film	319803922080
3441			Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3450	⚠		Res, 1 ohm, 5%, 1/3W, Metal Film	230620403108
3451		D	Res, 10 ohm, 1%, Metal Film	319803910090
3451		ABC	Res, 4.7 ohm, 1%, 1/16W, Metal Film	319803947080
3453			Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3455	⚠		Res, Fuse, 0.27 ohm, 5%	230620703277
3456	⚠		Res, Fuse, 0.27 ohm, 5%	230620703277
3458			Res, 4R7, 5%, 1/2W, Metal Film	230620703478
3459		A	Res, 820K, 5%, 1/16W, Metalized Glass	232270260824
3459		BC	Res, 470K, 5%, 1/16W, Metalized Glass	319802134740
3459		D	Res, 680K, 5%, 1/16W, Metalized Glass	319802136840
3460			Res, 56K, 1%, 1/16W, Metalized Glass	232270465603
3461			Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3462			Res, 18K, 1%, 1/16W, Metalized Glass	232270461803
3463			Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3466			Res, 1R5, 5%, 1/3W, Metal Film	230620403158
3467			Res, 100 ohm, 1%, Metal Film	319803910010
3468			Res, 100 ohm, 1%, Metal Film	319803910010
3469			Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3471			Res, 2.2 ohm, 1%, 1/16W, Metal Film	319803922080
3472		AD	Res, 1.2 ohm, 1%, Metal Film	319803912080
3472		BC	Res, 2.2 ohm, 1%, 1/16W, Metal Film	319803922080
3473			Res, 15 ohm, 5%, 1 1/3W, Metal Film	319801221590
3477			Res, 1K5, 5%, 1/6W, Carbon Film	319801101520
3478			Res, 33K, 5%, 1/6W, Carbon Film	319801103330

3481			Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3485	⚠	D	Res, 1 ohm, 5%, 1/3W, Metal Film	230620403108
3485	⚠	ABC	Res, Fuse, 0.47 ohm, 5%	230620703477
3486	⚠		Res, 1 ohm, 5%, 1/3W, Metal Film	230620403108
3489			Res, 10K, 5%, 1/6W, Carbon Film	319801101030
3490			Res, 150 ohm, 1%, 1/16W, Metal Film	319803915010
3491		A	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3491		BCD	Res, 8K2, 5%, 1/16W, Metalized Glass	319802138220
3492		A	Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3492		BCD	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3493			Res, 2R2, 5%, 1/2W, Metal Film	230620703228
3496			Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3497			Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3499			Res, 470K, 5%, 1/6W, Carbon Film	319801104740
3500			Res, 3M3, 5%, 1/2W, Metalized Glass	232224213335
3501			Res, 3M3, 5%, 1/2W, Metalized Glass	232224213335
3502			Res, 220 ohm, 20%, 1/2W, Carbon Film	319801302210
3503	⚠		Surge Protector	242254943073
3504			Res, 1M5, 5%, 1/2W, Metalized Glass	232224213155
3505			VDR, 1mA/612V	212255000158
3510			NTC DC B57364 5W1 S 2R0 PM20 B	212261200077
3511			Res, 4R7, 5%, 1/6W, Carbon Film	319801104780
3512			Res, 1K2, 5%, 1/16W, Metalized Glass	319802131220
3513			Res, 2K2, 5%, 1/3W, Metal Film	230620403222
3514			Res, 100 ohm, 5%, 1/3W, Metal Film	230620403101
3515			Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3516			Res, 0.1 ohm, 5%, 3/5W, Metal Film	319801211070
3517			Res, 300k, 1%, Metalized Glass	232270463004
3518			Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3519			Res, 15K, 5%, 1/6W, Carbon Film	319801101530
3520			Res, 0.12ohm, 5%, 1W	212010500036
3521			Res, 3K3, 5%, 1/6W, Carbon Film	319801103320
3522			Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3523			PTC, 1R5, 20%, 145v, DBL-MONO	232266296753
3524			Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3525			Res, 330K, 1%, Metal Film	319803933040
3526			Res, 150 ohm, 5%, 1/8W, Metalized Glass	232275061501
3527			Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3528			Res, 1M, 5%, 1/16W, Metalized Glass	319802131050
3529			Res, 2M2, 5%, 1/16W, Metalized Glass	319802132250
3530			Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3531			Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3532			Res, 1 ohm, 5%, 1/10W, Metalized Glass	319802151080
3533			Res, 1 ohm, 5%, 1/10W, Metalized Glass	319802151080
3534			Res, 33 ohm, 5%, 1/6W, Carbon Film	319801103390
3535			Res, 1 ohm, 5%, 1/2W, Metal Film	230620703108

3536		Res, 220 ohm, 5%, 1/3W, Metal Film	230620403221
3538		Res, 1 ohm, 5%, 1/10W, Metalized Glass	319802151080
3539		Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3541		Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3542		Res, 680 ohm, 5%, 1/16W, Metalized Glass	319802136810
3543		Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3544		Res, 2K4, 1%, 1/16W, Metalized Glass	232270462402
3545		Res, 820 ohm, 1%, 1/16W, Metalized Glass	232270468201
3546		Res, 68K, 5%, 1/16W, Metalized Glass	319802136830
3549		Res, 3K3, 5%, 1/6W, Carbon Film	319801103320
3550		Res, 220K, 5%, 1/16W, Metalized Glass	319802132240
3551		Res, 4R7, 5%, 1/16W, Metalized Glass	319802134780
3553		Res, 39K, 5%, 1/16W, Metalized Glass	319802133930
3560		Res, 33 ohm, 5%, 1W, Metal Film	319801213390
3563		Res, 220 ohm, 5%, 1/6W, Carbon Film	319801102210
3565		Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3567		Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3568		Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3571		Res, 470 ohm, 5%, 1/10W, Metalized Glass	319802154710
3573		Res, 15K, 5%, 1/16W, Metalized Glass	319802131530
3574		Res, 82K, 5%, 1/10W, Metalized Glass	319802158230
3575		Res, 82k ohm, 1%, 1/16W, Metal Film	319803982030
3576		Res, 1K5, 1%, 1/16W, Metalized Glass	232270461502
3579		Res, 2K2, 5%, 1/16W, Metalized Glass	319802132220
3581		Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3583		Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3585		Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3586		Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3587		Res, 2K2, 5%, 1/16W, Metalized Glass	319802132220
3588		Res, 330K, 5%, 1/16W, Metalized Glass	319802133340
3589		Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3590		Res, 82K, 5%, 1/16W, Metalized Glass	319802138230
3591		Res, 18K, 5%, 1/16W, Metalized Glass	319802131830
3592	⚠	Res, 68K, 5%, 2W	319801226830
3593		Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3594		Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3595		Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3596		Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3597		Res, 220K, 5%, 1/16W, Metalized Glass	319802132240
3598		Res, 100K, 5%, 1/4W, Metalized Glass	232224153104
3599		Res, 1M5, 5%, 1/4W, Metalized Glass	232224153155
3601		Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3604		Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3605		Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3606		Res, 56K, 5%, 1/6W, Carbon Film	319801105630
3607		Res, 10K, 5%, 1/16W, Metalized Glass	319802131030

3608	Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3609	Res, 330 ohm, 5%, 1/16W, Metalized Glass	319802133310
3634	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3635	Res, 39K, 5%, 1/16W, Metalized Glass	319802133930
3637	Res, 47 ohm, 5%, 1/16W, Metalized Glass	319802134790
3647	Res, 33K, 5%, 1/16W, Metalized Glass	319802133330
3648	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3649	Res, 470 ohm, 5%, 1/16W, Metalized Glass	319802134710
3650	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3690	Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3984	Res, 56K, 5%, 1/6W, Carbon Film	319801105630
3985	Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3986	Res, 27K, 5%, 1/16W, Metalized Glass	319802132730
3988	Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3989	Res, 10 ohm, 5%, 1/16W, Metalized Glass	319802131090
3991	Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3992	Res, 5K6, 5%, 1/16W, Metalized Glass	319802135620
3993	Res, 10 ohm, 5%, 1/16W, Metalized Glass	319802131090
3994	Res, 68K, 5%, 1/16W, Metalized Glass	319802136830
3995	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
4000	Res, Zero ohm, 'Chip' Jumper	319802190030
4001	Res, Zero ohm, 'Chip' Jumper	319802190030
4002	Res, Zero ohm, 'Chip' Jumper	319802190030
4003	Res, Zero ohm, 'Chip' Jumper	319802190030
4006	Res, Zero ohm, 'Chip' Jumper	319802190030
4013	Res, Zero ohm, 'Chip' Jumper	319802190030
4015	Res, Zero ohm, 'Chip' Jumper	319802190030
4116	Res, Zero ohm, 'Chip' Jumper	319802190030
4145	Res, Zero ohm, 'Chip' Jumper	319802190030
4160	Res, Zero ohm, 'Chip' Jumper	319802190030
4201	Res, Zero ohm, 'Chip' Jumper	319802190020
4209	Res, Zero ohm, 'Chip' Jumper	319802190030
4221	Res, Zero ohm, 'Chip' Jumper	319802190030
4222	Res, Zero ohm, 'Chip' Jumper	319802190030
4223	Res, Zero ohm, 'Chip' Jumper	319802190020
4226	Res, Zero ohm, 'Chip' Jumper	319802190030
4227	Res, Zero ohm, 'Chip' Jumper	319802190030
4251	Res, Zero ohm, 'Chip' Jumper	319802190030
4253	Res, Zero ohm, 'Chip' Jumper	319802190020
4254	Res, Zero ohm, 'Chip' Jumper	319802190030
4297	Res, Zero ohm, 'Chip' Jumper	319802190020
4299	Res, Zero ohm, 'Chip' Jumper	319802190030
4401	Res, Zero ohm, 'Chip' Jumper	319802190030
4418	Res, Zero ohm, 'Chip' Jumper	319802190020
4470	Res, Zero ohm, 'Chip' Jumper	319802190020
4527	Res, Zero ohm, 'Chip' Jumper	319802190030

4533		Res, Zero ohm, 'Chip' Jumper	319802190020
4540		Res, Zero ohm, 'Chip' Jumper	319802190030
4567		Res, Zero ohm, 'Chip' Jumper	319802190030
4604		Res, Zero ohm, 'Chip' Jumper	319802190030
4612		Res, Zero ohm, 'Chip' Jumper	319802190020
4614		Res, Zero ohm, 'Chip' Jumper	319802190030
4617		Res, Zero ohm, 'Chip' Jumper	319802190030
4642		Res, Zero ohm, 'Chip' Jumper	319802190030
4644		Res, Zero ohm, 'Chip' Jumper	319802190030
4646		Res, Zero ohm, 'Chip' Jumper	319802190030
4649		Res, Zero ohm, 'Chip' Jumper	319802190030
4653		Res, Zero ohm, 'Chip' Jumper	319802190030
4691		Res, Zero ohm, 'Chip' Jumper	319802190030
4692		Res, Zero ohm, 'Chip' Jumper	319802190030
4694		Res, Zero ohm, 'Chip' Jumper	319802190030
4992		Res, Zero ohm, 'Chip' Jumper	319802190020
4993		Res, Zero ohm, 'Chip' Jumper	319802190030
5001		Fixed Inductor, 100MHz, 120R	319801890030
5002		Coil, 560n	319801835670
5201		Fixed, Inductor, 100MHz, 50R	319801890010
5202		Fixed Inductor, 100MHz, 120R	319801890030
5203		Fixed Inductor, 100MHz, 120R	319801890030
5205		Fixed Inductor, 100MHz, 120R	319801890030
5206		Fixed Inductor, 100MHz, 120R	319801890030
5207		Fixed Inductor, 100MHz, 120R	319801890030
5208		Fixed, Inductor, 100MHz, 50R	319801890010
5209		Fixed Inductor, 100MHz, 120R	319801890030
5210		Fixed Inductor, 100MHz, 120R	319801890030
5211		Fixed Inductor, 100MHz, 120R	319801890030
5212		Fixed Inductor, 100MHz, 120R	319801890030
5213		Fixed Inductor, 100MHz, 120R	319801890030
5215		Fixed Inductor, 100MHz, 120R	319801890030
5216		Fixed, Inductor, 100MHz, 50R	319801890010
5401	BC	Line Choke	242253601067
5401	AD	Coil, 50uH.	310430820471
5402		TFM SIG DRIVER SD12404-02 Y	242253100057
5408	BC	COI BRIDGE W7131-003 B	242253102334
5408	AD	COI BRIDGE W7132-004 Y	242253102357
5450	BC	TFM LOT, JF0101-85038 B	242253100067
5450	A	TFM LOT JF0101-85039 B	242253100068
5450	D	TFM LOT JF0101-85040 B	242253100069
5452		Coil, 10u	319801821090
5456	BC	TFM SIG DYN FOC SD20417-07 Y	242253100078
5457		IND FXD 0805 EMI 100MHZ 60R R	242254945186
5458		IND FXD 0805 EMI 100MHZ 60R R	242254945186
5459		Coil, 560n	242253595339

5504	TFM SMT LAYER SS28411-00 B	242253100065
5506	FIL MAINS 30MH 3A DMF3530 Y	242254945783
5511	Fixed, Inductor, 100MHz, 50R	319801890010
5512	TFM SMT LAYER SS42408-00 B	242253100064
5521	Fixed, Inductor, 100MHz, 50R	319801890010
5523	Inductor, Fixed, 100Mhz, 120R	319801890070
5524	Coil, 4u7	319801874780
5526	Coil, 4u7	319801874780
5527	Coil, 4u7	319801874780
5551	Fixed, Inductor, 100MHz, 50R	319801890010
5552	Coil, 27u	242253595366
5561	Fixed, Inductor, 100MHz, 50R	319801890010
5562	Fixed, Inductor, 100MHz, 50R	319801890010
5564	FIL MAINS 4MH 2A8 DMF2404 Y	242254900408
5601	Res, Zero ohm, 'Chip' Jumper	319802190030
6001	Zener Diode, 33 volt	319801023390
6006	Zener Diode, 8.2 volt	319801058280
6106	Zener Diode, 15V	319802051590
6132	Zener Diode, 15V	319802051590
6203	Diode, Signal, BAS316	319801010630
6204	Diode, Rect, SS14	319801010710
6207	Diode, Signal, BAS316	319801010630
6209	Diode, Signal, BAT54	319801010660
6403	Diode, Rect, RGP10D	933751660673
6404	Diode, Rect, DMV1500M	932216961687
6442	Zener Diode, 10 volt	933500650133
6449	Zener Diode, 12V	319802051290
6452	Diode, Rect, RGP10D	933751660673
6453	Diode, Rect, RGP10G	933493960673
6456	Diode, Rect, BYV27-200	932212672673
6457	Diode, Rect, BYV27-200	932212672673
6458	Diode, Signal, BAS316	319801010630
6461	Diode, Rect, RGP10D	933751660673
6464	Zener Diode, 15V	319802051590
6466	Diode, Rect, RGP10D	933751660673
6467	Diode, Rect., BYV29X-500	934055559127
6471	Diode, Rect, RGP10D	933751660673
6476	Zener Diode, 6.8 volt	933500610133
6480	Zener Diode, 15 volt	934054863115
6481	Diode, Signal, BAS316	319801010630
6484	Diode, Signal, BAS316	319801010630
6487	Diode, Signal, BAS316	319801010630
6489	Diode, Signal, BAS316	319801010630
6490	Diode, Signal, BAS316	319801010630
6491	Zener Diode, 3.3V	319802053380
6500	Diode, Bridge Rect, GBU6JL-7002	932213808667

6511	Diode, Rect, RGP10D	933751660673
6512	Zener Diode, 18V	319802051890
6514	Diode, Signal, BAS316	319801010630
6531	Diode, Signal, BAS316	319801010630
6532	Diode, BAV21WS	932219745703
6533	Diode, Rect, RGP10D	933751660673
6534	Diode, Signal, BAS316	319801010630
6536	Diode, Signal, BAS316	319801010630
6537	Diode, BAV21WS	932219745703
6538	Diode, BAV21WS	932219745703
6539	Diode, Rect, SB360	319801010700
6540	Diode, Signal, BAS316	319801010630
6541	Zener Diode, 12V	319802051290
6542	Zener Diode, 6.2 volt	932212911685
6543	Diode, Signal, BAS316	319801010630
6546	DIO REC STPS10L25D	932220957687
6547	Zener Diode, 6.8V	319802056880
6548	Double Diode, High Speed, BAW56W	934026020115
6549	DIO REG SM UDZS13B	932221282685
6550	IC SARS03(LF4)	932218509682
6551	Diode, Rect, BYT28-500	933744380127
6552	DIO REC STPS10L25D	932220957687
6562	Diode, Rect, SB360	319801010700
6563	Diode, Rect, SB360	319801010700
6575	Diode, Rect, 1N5392	932200516683
6602	Diode, Signal, BAV99	319801010620
6603	Zener Diode, 2.7V	319802052780
6694	Zener Diode, 5.1V	319802055180
7200	IC SM TDA12001H1/N1B501AS	935275761557
7201	Transistor, NPN, IMX1	932205428685
7203	Transistor, PNP, BC327-25	319802043430
7204	Transistor, PNP, BC327-25	319802043430
7207	Transistor, NPN, BC847B	319801042030
7209	Transistor, FET Signal, BSH103	934054713215
7210	Transistor, FET Signal, BSH103	934054713215
7404	Transistor, FET Signal, BSH103	934054713215
7405	Transistor, NPN, BU2527DX	934049680127
7406	FET POW FQPF3N60	932216034687
7407	Transistor, NPN, PDTC144ET	319801044130
7408	Transistor, PNP, BC856B	933589730215
7451	IC E-TDA8177F	932214436687
7510	IC SM TEA1506T/N1	935272043518
7511	IC SM TEA1506T/N1	935272043518
7512	FET POW FQPF13N50C	932221806687
7513	Optic Coupler, TCET1103(G)	932214014667
7514	Transistor, NPN, BC847B	319801042030

7516		Optic Coupler, TCET1103(G)	932214014667
7525		FET POW STP6NK60ZFP	932219177687
7532		Transistor, PNP, BC857B	319801042150
7535		FET POW SM SI2307DS-E3	932219077685
7541		Transistor, PNP, BC857B	319801042150
7542		IC TL431ACZ	319801070500
7547		Transistor, NPN, PDTC143ZT	934054700215
7549		Transistor, NPN, IMX1	932205428685
7561		Transistor, NPN, PDTC143ZT	934054700215
7567		Transistor, NPN, BC847B	319801042030
7571		IC TL431ACZ	319801070500
7573		Transistor, NPN, PDTC114ET	319801044110
7575		Transistor, NPN, PDTC143ZT	934054700215
7576		Transistor, NPN, BC847BW	319801042310
7577		Transistor, NPN, BC847BW	319801042310
7583		Transistor, NPN, BC847BW	319801042310
7584		Transistor, NPN, BC847BW	319801042310
7585		Transistor, PNP, BC857B	319801042150
7601		IC, M24C16-WBN6	932214725682
7604		Transistor, NPN, BC847B	319801042030
7605		Transistor, PNP, BC327-25	319802043430
7606		Transistor, NPN, BC847B	319801042030
7608		Transistor, NPN, PMBT2369	319801043360
7990		IC, TDA2616Q/N1	935040440112
7991		Transistor, NPN, BC847B	319801042030
7992		Transistor, NPN, BC847B	319801042030
8280		Cable, 5 Pin, 680mm	313911038861
		CRT PANEL	
CBA	A	CRT Board Assy	313918885321
CBA	BC	CRT Board Assy	313918885661
CBA	D	CRT Board Assy	313926714581
1054	A	PNL-CRT-N.DAF-16MHZ-26WR ATSC	313918885331
1054	BC	PNL-CRT-DAF-16MHZ ATSC	313918885671
1054	D	PNL-CRT-N.DAF-16MHZ-32RF ATSC	313926714591
1335	AD	Ground Terminal Assembly 340mm	313912108883
1340		Connector, 5 Pin	242202510428
1351		Connector, 7 Pin	242202511244
1362		Connector, 3 Pin	242202516601
1381		Connector, 3 Pin	241202000725
2313		Cap, 47u, 20%, 250V, Electrolytic	202001293786
2317	⚠	Cap, 4n7, 5%, 1600V, Polypropylene	222237590145
2319		Cap, 10n, +80/-20%, 50V, Ceramic	319801921030
2330		Cap, 100n, 10%, 16V, Ceramic	319801731040
2331		Cap, 100n, 10%, 16V, Ceramic	319801731040
2332		Cap, 4n7, 10%, 50V, Ceramic	319801734720

2333		Cap, 680p, 5%, 25V, Ceramic	319801636810
2334		Cap, 100n, 10%, 16V, Ceramic	319801731040
2335		Cap, 12p, 5%, 50V, Ceramic	319801631290
2336		Cap, 33n, 10%, 16V, Ceramic	319801733330
2337		Cap, 12p, 5%, 50V, Ceramic	319801631290
2338		Cap, 100n, 10%, 250V, Metalized Polyester	202231800109
2339		Cap, 100n, 10%, 250V, Metalized Polyester	202231800109
2340		Cap, 100n, 10%, 250V, Metalized Polyester	202231800109
2341		Cap, 12p, 5%, 50V, Ceramic	319801631290
2343		Cap, 680p, 5%, 25V, Ceramic	319801636810
2344		Cap, 4n7, 10%, 50V, Ceramic	319801734720
2346		Cap, 33n, 10%, 16V, Ceramic	319801733330
2347		Cap, 470u, 20%, 16V, Electrolytic	319802524710
2352		Cap, 4n7, 10%, 50V, Ceramic	319801734720
2353		Cap, 680p, 5%, 25V, Ceramic	319801636810
2355		Cap, 22p, 5%, 50V, Ceramic	319801632290
2356		Cap, 33n, 10%, 16V, Ceramic	319801733330
2357		Cap, 10n, 10%, 50V, Ceramic	319801731030
2358		Cap, 22p, 5%, 50V, Ceramic	319801632290
2360		Cap, 22p, 5%, 50V, Ceramic	319801632290
2361		Cap, 1n, 10%, 50V, Ceramic	319801731020
2363		Cap, 47u, 20%, 200V, Electrolytic	202001293486
2364		Cap, 4n7, 10%, 250V, Ceramic	202055790732
2365		Cap, 4n7, 10%, 50V, Ceramic	319801734720
2367		Cap, 100n, 10%, 16V, Ceramic	319801731040
2368		Cap, 100n, 10%, 100V, Metalized Polyester	222236585104
2370		Cap, 100n, 10%, 16V, Ceramic	319801731040
2381		Cap, 47n, 10%, 50V, Polyester	319801404730
2382		Cap, 100n, 10%, 16V, Ceramic	319801731040
2383		Cap, 680p, 5%, 50V, Ceramic	319801606810
2384		Cap, 100n, 10%, 16V, Ceramic	319801731040
2385		Cap, 100n, 10%, 16V, Ceramic	319801731040
2387		Cap, 10n, 10%, 50V, Ceramic	319801731030
2389		Cap, 100n, 10%, 16V, Ceramic	319801731040
2390		Cap, 10u, 20%, 16V, Electrolytic	319802821090
2391		Cap, 100n, 10%, 16V, Ceramic	319801731040
2392		Cap, 4n7, 10%, 50V, Ceramic	319801734720
2393	BC	Cap, 220p, 10%, 50V, Ceramic	319801732210
3305	⚠	Res, 1 ohm, 5%, 1/3W, Metal Film	230620403108
3309		Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3310		Res, 22 ohm, 5%, 1/16W, Metalized Glass	319802132290
3311		Res, 22 ohm, 5%, 1/16W, Metalized Glass	319802132290
3317		Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3320		Res, 470 ohm, 5%, 1/16W, Metalized Glass	319802134710
3321		Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3322		Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010

3323		Res, 470 ohm, 5%, 1/16W, Metalized Glass	319802134710
3324		Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3325		Res, 1K8, 5%, 1/16W, Metalized Glass	319802131820
3326		Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3327		Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3328		Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3329		Res, 470 ohm, 5%, 1/16W, Metalized Glass	319802134710
3331		Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3332		Res, 1K, 20%, 1/2W, Carbon Film	319801301020
3333		Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3334		Res, 1K, 20%, 1/2W, Carbon Film	319801301020
3335		Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3336		Res, 1K, 20%, 1/2W, Carbon Film	319801301020
3337		Res, 120K, 5%, 1/4W, Carbon Film	212210102074
3338		Res, 2K7, 5%, 1/16W, Metalized Glass	319802132720
3339		Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3340		Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3341		Res, 120K, 5%, 1/4W, Carbon Film	212210102074
3342		Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3343		Res, 2K7, 5%, 1/16W, Metalized Glass	319802132720
3344		Res, 1K, 5%, 1/6W, Carbon Film	319801101020
3345		Res, 33 ohm, 1%, 1/16W, Metal Film	319803933090
3347		Res, 1K5, 20%, 1/2W, Carbon Film	319801301520
3350		Res, 6.8K, 5%, 1/6W, Carbon Film	319801106820
3351		Res, 150 ohm, 5%, 1/2W, Metal Film	230620703151
3352		Res, 120K, 5%, 1/4W, Carbon Film	212210102074
3353		Res, 2K7, 5%, 1/16W, Metalized Glass	319802132720
3354		Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3355		Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3357		VDR 1mA/18V, 35V Max	212255200004
3361	AD	Res, 680 ohm, 5%, 1/16W, Metalized Glass	319802136810
3361	BC	Res, 680 ohm, 5%, 1/10W, Metalized Glass	319802156810
3362		Res, 10 ohm, 5%, 1/3W, Metal Film	230620403109
3363		Res, 560 ohm, 5%, 1/16W, Metalized Glass	319802135610
3364		Res, 1R5, 5%, 1/8W, Metalized Glass	232273061158
3365		Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3366		Res, 68K, 5%, 1/16W, Metalized Glass	319802136830
3367		Res, 68K, 5%, 1/6W, Carbon Film	319801106830
3368		Res, 560 ohm, 5%, 1/16W, Metalized Glass	319802135610
3369		Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
3370		Res, 1R5, 5%, 1/8W, Metalized Glass	232273061158
3371		Res, 2K2, 5%, 1/6W, Carbon Film	319801102220
3372		Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
3373		Res, 4K7, 5%, 5W, Metal Film	232225741472
3374		Res, 10 ohm, 5%, 1/3W, Metal Film	232220533109
3377		Res, 1K8, 5%, 1/16W, Metalized Glass	319802131820

3378		Res, 330 ohm, 5%, 1/16W, Metalized Glass	319802133310
3379		Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3380		Res, 22K, 5%, 1/16W, Metalized Glass	319802132230
3381		Res, 33K, 5%, 1/16W, Metalized Glass	319802133330
3382		Res, 8K2, 5%, 1/16W, Metalized Glass	319802138220
3383		Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3390	BC	VDR 1mA/18V, 35V Max	212255200004
3394		Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3395		Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3396		Res, 1K8, 5%, 1/16W, Metalized Glass	319802131820
3398		Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3399		Res, 270 ohm, 5%, 1/3W, Metal Film	230620403271
3999	A	Res, 2K2, 5%, 1/16W, Metalized Glass	319802132220
3999	D	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3999	BC	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
4321		Res, Zero ohm, 'Chip' Jumper	319802190030
5303		Coil, 5u6	319801815680
5304		Fixed, Inductor, 100MHz, 50R	319801890010
5308		Coil, 5u6	319801815680
5324		Fixed, Inductor, 100MHz, 50R	319801890010
5361		Fixed, Inductor, 100MHz, 80 ohm	319801890020
5362		Coil, 1u	319801831080
6307		Zener Diode, 6.8V	319802056880
6325		Zener Diode, 3.3 volt	319801023380
6331		Diode, BAV21WS	932219745703
6332		Diode, BAV21WS	932219745703
6333		Diode, BAV21WS	932219745703
6334		Zener Diode, 3.3V	319802053380
6361		Diode, Signal, BAV99	319801010620
6362		Diode, Signal, BAS316	319801010630
6363		Diode, Signal, BAV99	319801010620
7330		IC TDA6111Q/N4	935173950112
7331		Transistor, NPN, BC847B	319801042030
7332		TRA SIG TBC328-40	319801040190
7333		TRA SIG TBC338-40	319801040180
7340		IC TDA6111Q/N4	935173950112
7350		IC TDA6111Q/N4	935173950112
7351		Transistor, NPN, BC847B	319801042030
7352		Transistor, NPN, BC847B	319801042030
7353		Transistor, NPN, BC847B	319801042030
7361		Transistor, NPN, BF840	933792670215
7362		Transistor, PNP, BF824	933722350215
7363		Transistor, KTB631KY	932219505687
7364		Transistor, KTD600KY	932219514687
7365		Transistor, NPN, BF840	933792670215
7366		IC TDA8941P/N1	935262851112

ASSY-DEFL-CTRL-NA

CBA	BC	Defl - Control Assy	313926712641
1250	BC	Connector, 12 Pin	242202516219
1251	BC	Connector, 10 Pin	242202518582
1400	BC	Connector, 3 Pin	242202509191
1401	BC	Connector, 8 Pin	242202512492
1402	BC	Ceramic Resonator 503KHZ5	242254098458
1403	BC	Connector, 6 Pin	242202510738
1404	BC	Connector, 5 Pin	242202509364
1405	BC	Connector, 3 Pin	242202509191
2402	BC	Cap, 1u, +80/-20%, 10V, Ceramic	319801741050
2403	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2405	BC	Cap, 22u, 20%, 16V, Electrolytic	319802822290
2406	BC	Cap, 470u, 20%, 16V, Electrolytic	202001200003
2407	BC	Cap, 470u, 20%, 16V, Electrolytic	202001200003
2408	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2409	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2410	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2412	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2413	BC	Cap, 470u, 20%, 16V, Electrolytic	202001200003
2414	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2415	BC	Cap, 2u2, +80/-20%, 10V, Ceramic	319801722250
2416	BC	Cap, 1n, 5%, 25V, Ceramic	319801631020
2418	BC	Cap, 47n, 10%, 16V, Ceramic	319801734730
2419	BC	Cap, 2n2, 10%, 50V, Ceramic	319801732220
2420 ⚠	BC	Cap, 1000uF, 20%, 16V, Electrolytic	319803821020
2421	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2422	BC	Cap, 470n, +80/-20%, 10V, Ceramic	319801744740
2423	BC	Cap, 4u7, 10%, 6v3, Ceramic	202255205731
2424	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2425	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2426	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2427	BC	Cap, 470n, +80/-20%, 10V, Ceramic	319801744740
2428	BC	Cap, 22n, 10%, 50V, Polyester	319801402230
2429	BC	Cap, 1u, 10%, 50V, Polyester	319801401050
2431	BC	Cap, 1n, 5%, 25V, Ceramic	319801631020
2432	BC	Cap, 1u, 10%, 50V, Polyester	319801401050
2433	BC	Cap, 2u2, 10%, 10V, Ceramic	202055296702
2434	BC	Cap, 2u2, 10%, 10V, Ceramic	202055296702
2435	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2436	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2437	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2438	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2439	BC	Cap, 2u2, 10%, 10V, Ceramic	202055296702
2441	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040

2442	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2443	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2444	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2446	BC	Cap, 1u, +80/-20%, 16V, Ceramic	319801721050
2447	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2448	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2449	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2450	BC	Cap, 1u, +80/-20%, 16V, Ceramic	319801721050
2451	BC	Cap, 100n, 10%, 16V, Ceramic	319801731040
2452	BC	Cap, 330p, 5%, 50V, Ceramic	319801633310
2453	BC	Cap, 10n, 10%, 50V, Ceramic	319801731030
2454	BC	Cap, 10p, 5%, 50V, Ceramic	319801631090
2455	BC	Cap, 1u, +80/-20%, 16V, Ceramic	319801721050
2456	BC	Cap, 10p, 5%, 50V, Ceramic	319801631090
2457	BC	Cap, 1u, +80/-20%, 16V, Ceramic	319801721050
2458	BC	Cap, 1u, +80/-20%, 16V, Ceramic	319801721050
2459	BC	Cap, 10p, 5%, 50V, Ceramic	319801631090
2460	BC	Cap, 10n, 10%, 50V, Ceramic	319801731030
2461	BC	Cap, 100u, 20%, 16V, Electrolytic	319803041010
2462	BC	Cap, 100u, 20%, 16V, Electrolytic	319803041010
2463	BC	Cap, 10n, 10%, 50V, Ceramic	319801731030
2464	BC	Cap, 10n, 10%, 50V, Ceramic	319801731030
2465	BC	Cap, 10n, 10%, 50V, Ceramic	319801731030
2466	BC	Cap, 10u, 20%, 16V, Electrolytic	319803041090
2487	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
2488	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
2489	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
2490	BC	Cap, 10u, 20%, 16V, Electrolytic	319803041090
2497	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
2498	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
2499	BC	Cap, 47p, 5%, 50V, Ceramic	319801634790
3400	BC	Res, 240 ohm, 1%, 1/8W, Metalized Glass	232273462401
3401	BC	Res, 2K2, 5%, 1/16W, Metalized Glass	319802132220
3403	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3404	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3405	BC	Res, 240 ohm, 1%, 1/8W, Metalized Glass	232273462401
3406	BC	Res, 240 ohm, 1%, 1/8W, Metalized Glass	232273462401
3407	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3408	BC	Res, 390K, 5%, 1/16W, Metalized Glass	232270260394
3409	BC	Res, 120K, 5%, 1/16W, Metalized Glass	232270260124
3410	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3411	BC	Res, 82K, 5%, 1/16W, Metalized Glass	319802138230
3412	BC	Res, 120K, 5%, 1/16W, Metalized Glass	232270260124
3413	BC	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3414	BC	Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
3415	BC	Res, 220K, 5%, 1/16W, Metalized Glass	319802132240

3416	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3417	BC	Res, 270 ohm, 5%, 1/16W, Metalized Glass	319802132710
3418	BC	Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3419	BC	Res, 2K7, 5%, 1/16W, Metalized Glass	319802132720
3420	BC	Res, 20K, 5%, 1/16W, Metalized Glass	232270260203
3421	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3422	BC	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3423	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3424	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3425	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3426	BC	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3427	BC	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3428	BC	Res, 4K7, 5%, 1/16W, Metalized Glass	319802134720
3429	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3430	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3431	BC	Res, 2K, 1%, 1/16W, Metalized Glass	232270462002
3433	BC	Res, 1K2, 5%, 1/16W, Metalized Glass	319802131220
3434	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3435	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3436	BC	Res, 180 ohm, 5%, 1/16W, Metalized Glass	319802131810
3437	BC	Res, 2K7, 5%, 1/16W, Metalized Glass	319802132720
3438	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3439	BC	Res, 470 ohm, 5%, 1/16W, Metalized Glass	319802134710
3440	BC	Res, 2K, 1%, 1/16W, Metalized Glass	232270462002
3441	BC	Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
3442	BC	Res, 33K, 5%, 1/16W, Metalized Glass	319802133330
3443	BC	Res, 1K, 1%, 1/16W, Metalized Glass	232270461002
3444	BC	Res, 56K, 5%, 1/16W, Metalized Glass	319802135630
3445	BC	Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3446	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3447	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3448	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3449	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3450	BC	Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3451	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3452	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3453	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3454	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3455	BC	Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3456	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3457	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3458	BC	Res, 10K, 5%, 1/16W, Metalized Glass	319802131030
3459	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3460	BC	Res, 220 ohm, 5%, 1/16W, Metalized Glass	319802132210
3461	BC	Res, 330K, 5%, 1/16W, Metalized Glass	319802133340
3462	BC	Res, 68K, 5%, 1/16W, Metalized Glass	319802136830

3463	BC	Res, 68K, 5%, 1/16W, Metalized Glass	319802136830
3464	BC	Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3465	BC	Res, 20K, 5%, 1/16W, Metalized Glass	232270260203
3466	BC	Res, 100K, 5%, 1/16W, Metalized Glass	319802131040
3467	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3468	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3469	BC	Res, 220K, 5%, 1/16W, Metalized Glass	319802132240
3470	BC	Res, 220K, 5%, 1/16W, Metalized Glass	319802132240
3471	BC	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3472	BC	Res, 3K9, 5%, 1/16W, Metalized Glass	319802133920
3473	BC	Res, 33K, 5%, 1/16W, Metalized Glass	319802133330
3474	BC	Res, 6K8, 5%, 1/16W, Metalized Glass	319802136820
3482	BC	Res, 24K, 1%, 1/16W, Metalized Glass	232270462403
3483	BC	Res, 2K, 1%, 1/16W, Metalized Glass	232270462002
3484	BC	Res, 47K, 5%, 1/16W, Metalized Glass	319802134730
3486	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3487	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3488	BC	Res, 3K3, 5%, 1/16W, Metalized Glass	319802133320
3489	BC	Res, 2K2, 5%, 1/16W, Metalized Glass	319802132220
3490	BC	Res, 47 ohm, 5%, 1/16W, Metalized Glass	319802134790
3491	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3492	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3493	BC	Res, 100 ohm, 5%, 1/16W, Metalized Glass	319802131010
3494	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3495	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3496	BC	Res, 1K, 5%, 1/16W, Metalized Glass	319802131020
3500	BC	Res, 24K, 1%, 1/16W, Metalized Glass	232270462403
3501	BC	Res, 24K, 1%, 1/16W, Metalized Glass	232270462403
3502	BC	Res, 24K, 1%, 1/16W, Metalized Glass	232270462403
3503	BC	Res, 2K, 1%, 1/16W, Metalized Glass	232270462002
3504	BC	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3505	BC	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3506	BC	Res, 75 ohm, 5%, 1/16W, Metalized Glass	319802137590
3507	BC	Res, 240 ohm, 1%, 1/8W, Metalized Glass	232273462401
4400	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4402	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4488	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4489	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4490	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4491	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4492	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4493	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4494	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4495	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
4499	BC	Res, Zero ohm, 'Chip' Jumper	319802190030
5400	BC	Fixed Inductor 100MHZ 220R	242254944197

5401	BC	Fixed Inductor 100MHZ 220R	242254944197
5402	BC	Fixed Inductor 100MHZ 220R	242254944197
5403	BC	Fixed Inductor 100MHZ 220R	242254944197
5496	BC	Coil, 470n	319801834770
5497	BC	Coil, 470n	319801834770
5498	BC	Coil, 470n	319801834770
6400	BC	Zener Diode, 8.2V	319802058280
6402	BC	Diode, Signal, BAS316	319801010630
6404	BC	Zener Diode, 9.1V	932215008685
6405	BC	Zener Diode, 6.8V	319802056880
6406	BC	Diode, Signal, BAS316	319801010630
6408	BC	Diode, Signal, BAS316	319801010630
6409	BC	DIO REG SM UDZS2.0B	932221993685
6410	BC	Zener Diode, 8.2V	319802058280
7402	BC	IC SM TA1360AFG	932221351668
7403	BC	Transistor, NPN, BC847B	319801042030
7404	BC	IC SM TA1317AFG	932221353668
7405	BC	Transistor, NPN, BC847B	319801042030
7406	BC	Transistor, NPN, BC847B	319801042030
7407	BC	Transistor, PNP, BC857B	319801042150
7408	BC	Transistor, NPN, BC847B	319801042030
7409	BC	Transistor, PNP, BC857B	319801042150
7410	BC	Transistor, PNP, BC857B	319801042150
7411	BC	Transistor, PNP, BC857B	319801042150
7412	BC	Transistor, NPN, IMX1	932205428685
7413	BC	Transistor, NPN, IMX1	932205428685
7414	BC	Transistor, PNP, BC857B	319801042150
7415	BC	Transistor, PNP, BC857B	319801042150
7416	BC	Transistor, NPN, BC847B	319801042030
7417	BC	Transistor, NPN, BC847B	319801042030
7423	BC	IC SM LM2941S-NOPB	932222110668
7490	BC	Transistor, NPN, BC847B	319801042030
7491	BC	Transistor, NPN, BC847B	319801042030
7492	BC	Transistor, NPN, BC847B	319801042030

FRONT INTERFACE PANEL

CBA	D	Front Interface Panel Assy	313918806011
CBA	ABC	Front Interface Panel Assy	313918887291
1060	D	FRNT.INTERF-LS.PNL-NA	313918804761
1109	ABC	SWI SIGN 2P 0.1A 30V SPUN19 B	242212802909
1606	D	Switch, Tactile	242212802742
1693		Connector, 6 Pin	242202510738
2101	ABC	Cap, 220u, 20%, 25V, Electrolytic	319802532210
2102	ABC	Cap, 1u, 10%, 50V, Polyester	319801401050
2103	ABC	Cap, 100n, 10%, 50V, Polyester	319801401040
2691	D	Cap, 220u, 20%, 25V, Electrolytic	319802532210

2692	D	Cap, 1u, +80/-20%, 10V, Ceramic	319801741050
2698	D	Cap, 100n, 10%, 50V, Polyester	319801401040
3111	ABC	Res, 1K2, 5%, 1/6W, Carbon Film	319801101220
3112	ABC	Res, 220 ohm, 5%, 1/6W, Carbon Film	319801102210
3113	ABC	Res, 4K7, 5%, 1/6W, Carbon Film	319801104720
3114	ABC	Res, 150K, 5%, 1/6W, Carbon Film	319801101540
3691	D	Res, 1K2, 5%, 1/6W, Carbon Film	319801101220
3693	D	Res, 220 ohm, 5%, 1/6W, Carbon Film	319801102210
3694	D	Res, 4K7, 5%, 1/6W, Carbon Film	319801104720
3696	D	Res, 150K, 5%, 1/16W, Metalized Glass	319802131540
4601	D	Res, Zero ohm, 'Chip' Jumper	319802190030
6101	ABC	LED	932218569682
6102	ABC	IR Receiver, TSOP34836UH1B	932220678667
6103	ABC	OPT SEN LTR-301	932219736682
6691	D	LED	932218569682
6692	D	IR Receiver, TSOP34836UH1B	932220678667
6693	D	OPT SEN LTR-301	932219736682

SIDE A/V PANEL

CBA	ABC	Side A/V Panel Assy	313926715631
CBA	D	Side A/V Panel Assy	313926715661
1251	D	4 Pin Cinch Socket	242202605659
1252		Connector, 7 Pin	242202511244
1254		Connector, 5 Pin	242202512481
1278	D	Connector, 4 Pin	242202512479
1278	ABC	Connector, 4 Pin	242202515847
1280	ABC	Connector, 3 Pin	241202000725
1281	ABC	Connector, 3 Pin	242202516382
2171		Cap, 330p, 10%, 50V, Ceramic	319801913310
2172		Cap, 330p, 10%, 50V, Ceramic	319801913310
2173		Cap, 330p, 10%, 50V, Ceramic	319801913310
2174		Cap, 330p, 10%, 50V, Ceramic	319801913310
2175		Cap, 2u2, 20%, 50V, Electrolytic	319802952280
2176		Cap, 100n, 10%, 16V, Ceramic	319801731040
2178		Cap, 470p, 10%, 50V, Ceramic	319801734710
2180		Cap, 2u2, 20%, 50V, Electrolytic	319802952280
2181		Res, Zero ohm, 'Chip' Jumper	319802190030
3150		Res, 47K, 5%, 1/6W, Carbon Film	319801104730
3151		Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3152		Res, 47K, 5%, 1/6W, Carbon Film	319801104730
3153		Res, 22K, 5%, 1/6W, Carbon Film	319801102230
3154		Res, 75 ohm, 5%, 1/6W, Carbon Film	319801107590
3155	D	Res, 75 ohm, 5%, 1/6W, Carbon Film	319801107590
3156		Res, 820 ohm, 5%, 1/6W, Carbon Film	319801108210
3157		Res, 820 ohm, 5%, 1/6W, Carbon Film	319801108210
3158		Res, 75 ohm, 5%, 1/6W, Carbon Film	319801107590

3159		Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
3160		Res, 100 ohm, 5%, 1/6W, Carbon Film	319801101010
4180	D	Res, Zero ohm, 'Chip' Jumper	319802190020
		TOP CONTROL PANEL	
CBA	ABC	Top Control Panel Assy	313918887281
CBA	D	Top Control Panel Assy	313926710901
1010	D	Connector, 3 Pin	242202516601
1011	D	Switch, Tactile	242212802742
1012	D	Switch, Tactile	242212802742
1013	D	Switch, Tactile	242212802742
1014	D	Switch, Tactile	242212802742
1701	ABC	Switch, Tactile	242212802742
1702	ABC	Switch, Tactile	242212802742
1703	ABC	Switch, Tactile	242212802742
1704	ABC	Switch, Tactile	242212802742
1705	ABC	Switch, Tactile	242212802742
3008	ABC	Res, 150 ohm, 5%, 1/10W, Metalized Glass	319802151510
3010	ABC	Res, 390 ohm, 5%, 1/10W, Metalized Glass	319802153910
3011	D	Res, 150 ohm, 5%, 1/16W, Metalized Glass	319802131510
3011	ABC	Res, 560 ohm, 5%, 1/10W, Metalized Glass	319802155610
3012	D	Res, 390 ohm, 5%, 1/16W, Metalized Glass	319802133910
3013	D	Res, 1K8, 1%, 1/16W, Metalized Glass	232270461802
3013	ABC	Res, 1K8, 5%, 1/10W, Metalized Glass	319802151820
3014	ABC	Res, 820 ohm, 5%, 1/10W, Metalized Glass	319802158210
3014	D	Res, Zero ohm, 'Chip' Jumper	319802190030
3015	D	Res, 820 ohm, 1%, 1/16W, Metalized Glass	232270468201
3016	D	Res, Zero ohm, 'Chip' Jumper	319802190030
9000	ABC	Res, Zero ohm, 'Chip' Jumper	319802190020
9001	ABC	Res, Zero ohm, 'Chip' Jumper	319802190020
9002	ABC	Res, Zero ohm, 'Chip' Jumper	319802190020